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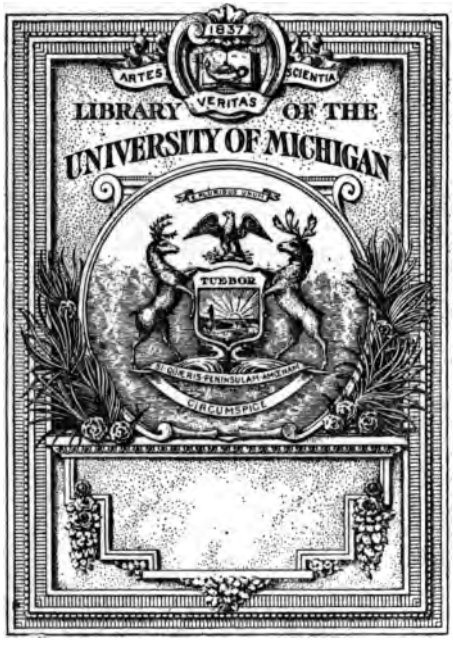
Managing A Business in War Time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From a photograph by Edward R. Dickson

It is evident to every thinking man that our industry on the farms, in the shipyards, in the mines, in the factories, must be made more prolific and more efficient than ever, and that they must be more economically managed and better adapted to our task.

WOODROW WILSON

MANAGING A BUSINESS IN WAR TIME

BUSINESS PRACTICES AND METHODS ACTUALLY TESTED UNDER WAR-TIME CONDITIONS, INCLUDING DATA BASED ON OFFICIAL BRITISH INVESTIGATIONS —SUGGESTIONS FOR DOING MORE WITH FEWER HANDS IN STORES, OFFICES, FACTORIES, AND FARM WORK

A. W. SHAW COMPANY
CHICAGO NEW YORK
LONDON

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HOW THESE BOOKS CAN HELP YOU

THERE is little doubt that, as the war goes on, the extraordinary public scrutiny which business is already undergoing will become more comprehensive and severe.

Business has come to be as vital a factor in war as an army or a navy. That the public should want it to be serving the nation adequately at every point, and should want to know that it is so serving, is only natural. Wherever there is a suspicion that it is engaged on a useless task, or is doing an important one in an incompetent manner, or is taking too large a profit, there is pretty certain to be an inquiry, followed by whatever corrective measures may be needed.

This has been the way in England. It has already begun to be the way here; and it is the simple logic of events that, as the demands on business increase, the inquiries and the resulting readjustments will multiply and spread to all lines—unless business itself makes the needed readjustments beforehand.

Now, of course, business has little to lose and practically everything to gain from readjustment for better national service. The concerns which serve the country best during the war are the ones most likely to come out of the war stronger than they went in. This is elementary economics, made doubly sure by the present temper of the public.

But there are the best reasons why the readjustment should, as far as possible, be made by business itself, and not left to be suggested or forced by the government.

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For one thing, to let incompetence or an abuse of any sort run on in private business until the public or its agents discover it, is to invite radical remedies. The remedies applied under such circumstances have sometimes been hardly less harmful than the evils they sought to correct. This was the case with some of the railroad and trust legislation of a few years ago.

But the best of all reasons for anticipating government action is that business, on its own account as well as on the nation's, needs to work out all the economies and other modifications which any intelligent public opinion could want it to make. To wait for the government to suggest them is, at best, to trifle with opportunity.

For by far the larger number of changes that business needs can never be imposed from outside. The government may lay down general rules to be observed. It may propose broad economics, like reductions in delivery service, which are applicable to a whole line or to several lines of business. There may even be some such modifications, especially those depending on united action among many concerns, which cannot easily be brought about without direction from the government. But for any concern to reach its maximum usefulness at this time requires close constructive study and prompt readjustment by the manager himself. No outside agency, not even the government, can act with his understanding of the factors involved.

In the present emergency, the way for the manager to serve the country and the way for him to serve the real interests of his business are essentially the same. To do either he must study how his business can render more essential and more effective service to the country. He must find out what his business can do which will help the country most in the war.

This may be simply to expand in his usual field. It may be to drop or to add a line. It may be to change the whole character of his business. Whatever it is, he must find it out and see that it is done. He must see that it is done with the least possible waste of material and labor. He must eliminate the clumsy method. He must cut off non-essential service. He must avoid the exorbitant mark-up. He must see to it that not merely as a whole and in its major functions, but in every minute detail, his business contributes to the effectiveness of the country in the war.

This is at once good citizenship and good business, and it should not wait on official urging.

In nearly every trade, certain lines or styles or services are maintained only because of competitive conditions. They increase investment, slow up stock turn, and increase expenses for both the merchant and his customer, yet serve no really important purpose. In most cases thoughtful men in the trade have been perfectly conscious of these needless and costly practices and would have been glad long since to be rid of them. But as excessive competition was responsible for them, so they have been suffered to continue because of excessive competition.

One cheerful fact about the war is that it has shaped conditions most favorably for their elimination. Patriotism has combined with the pressure of higher costs to make more business men willing to sacrifice any competitive advantage they may have got through these non-essential services. Moreover, what competitive advantage there was in them has dwindled because of the increased willingness of the public to do without them.

It was never easier than now for the trades to relieve themselves of the useless costs they have been carrying. Nor—considering the higher necessary costs, the war taxes, and the increasing Liberty Loans—was it ever

more desirable. Many trades have already been in conference to this end. Are there not others which should be?

In war time manufacturers frequently have to sacrifice some of the quality of their output for civilians in order to supply their trade at all. Shortage of materials or labor or the sudden pressure of some war demand leave them no other choice. The far-seeing manufacturer, however, will be careful not to let down any more on quality than is really necessary in the country's interest.

He will, of course, find plenty of temptation to do so. Customers are less critical. If they buy something that is not so good as usual, they think of the men in the trenches and are philosophical. They are apt to excuse inferior goods on the theory that the war has made them necessary, even though the war has not made them necessary. Competition, too, is in many lines less exacting. And so the manufacturer may slacken his efforts for a high grade product and suffer no immediate penalty.

But the penalty is obviously only deferred. For one thing, many of our future competitors are taking great pains not to slacken in this way. In England, comprehensive efforts have been made to find out where domestic manufactures are weak, and to improve them. In Germany, the societies for keeping up quality and good taste in manufactures are reported to be continuing their work in spite of the war. But even if nothing were being done abroad, the manufacturer who needlessly lowered his standard would be needlessly sacrificing a future advantage.

It is idle to say that quality can be raised again as quickly as it can be lowered. The skill and morale of the men responsible for the high quality suffers in the meantime. The men themselves are often scattered. It took

the printing art in the United States 25 years to recover from the backset it received during the Civil War.

The country has a great economic asset in its habit of quality production. The moment there is need, this asset should go as readily as any other into the prosecution of the war. But it is no more to be frittered away needlessly than the country's food.

You have already encountered many of these problems brought about by the war. You expect to be faced by many more.

These books are intended to help you meet the problems. They do not—purposely—gives sales plans for taking advantage of the war and the varied obligations which war places on consumers. It is obvious that many plans of this sort secure sales in a manner absolutely unquestionable and result in a worth-while extension of services valuable to the country. It is equally obvious that others among them are offensive to good taste because they seek to exploit patriotism and war-time obligations in a displeasing manner. Therefore the editors felt that you and the other readers of the books would prefer to have them avoid the subject entirely.

You will notice that a large portion of the material in Volume I is based on the experiences of British concerns and British commercial leaders. British business has faced for several years the same problems now confronting us—its experience should help us. The editors were particularly fortunate in being able to secure, through the editors of SYSTEM, the Magazine of Business, the cooperation of T. J. Zimmerman, the managing editor of its British edition, and his staff located in London. Ever since Great Britain entered the war Mr. Zimmerman has been studying the readjustments made by British business in the light of his experience as an American business man. The results of his study are of unusual importance.

PREFACE

If, after you have studied in the pages that follow the dozens of specific plans, methods, and policies which are helping concerns, both here and abroad, to play a better and more helpful part in both the military and the domestic arrangements necessary because of the war, there are other facts or suggestions which you need, write without hesitation to the editors of SYSTEM, the Magazine of Business. They will gladly do all they can to help you.

THE PUBLISHERS

MANAGING A BUSINESS IN WAR TIME

VOLUME I

CONTENTS

PART I—POINTERS FROM ABROAD THAT WILL HELP

I ADJUSTING A BUSINESS TO WAR-TIME CONDITIONS . 1
By T. J. Zimmerman,
Managing Editor, The British Edition of SYSTEM, the Magazine of Business.

II WHAT AMERICAN BUSINESS MEN CAN LEARN FROM BRITISH EXPERIENCE 37
By Lord Leverhulme

III WAR-TIME MANAGEMENT METHODS THAT HAVE WON SUCCESS 57
By G. E. Havinden,
Managing Director, The Watford Manufacturing Company, Ltd.

IV HOW AMERICA CAN MEET WAR-TIME BUSINESS CONDITIONS 73
By Sir Charles W. Macara, Bart.

V HOW ENGLAND IS MEETING THE LABOR PROBLEM . 76
By the Rt. Hon. John Hodge, M. P., Minister of Labor

VI THE PROBLEM OF MAN-POWER IN WAR TIME . . 89
By Colonel Sir Charles Cheers Wakefield, Bart.

VII RUNNING A STORE IN WAR TIME 91
By the late Sir Richard Burbidge, Bart.
Former Managing Director of Harrods, Ltd.

VIII HOW ENGLAND MET SIX IMPORTANT WAR-TIME BUSINESS PROBLEMS 101
By Lord Aberconway of Bodnant

IX HINTS ON HANDLING WAR-TIME BUSINESS . . . 106
By Lord Airedale of Gledhow

CONTENTS

X THE BIGGEST WAR-TIME TASKS FACING AMERICAN BUSINESS MEN 110
By Sir George Paish

XI SOME LESSONS THE WAR TAUGHT ENGLAND . . 118
A digest of "Practical Lessons of the War," by a special commissioner of *The Engineer* (London), and "Eclipse or Empire?" by H. B. Gray and Samuel Turner

XII WHAT CAN THE BUSINESS MAN LEARN FROM THE SOLDIER? 122
A digest of "Business Methods and the War," by Professor Laurence R. Dicksee of the University of London

PART II—HINTS FROM EXPERIENCE WAR WORK GAVE ENGLAND

XIII POINTERS GAINED MANUFACTURING MUNITIONS . 127
Collated by the Editorial Staff of SYSTEM, the Magazine of Business

XIV HOW WORKING HOURS AFFECT OUTPUT . . . 142
Collated by the Editorial Staff of SYSTEM, the Magazine of Business

XV A MANAGERIAL BY-PRODUCT FROM MUNITION WORK 161
Collated by the Editorial Staff of SYSTEM, the Magazine of Business

XVI TRAINING THE BOY WORKER 166
Collated by the Editorial Staff of SYSTEM, the Magazine of Business

XVII THE SIX MOST IMPORTANT FACTORS IN MEETING WAR-TIME CONDITIONS 174
By a British Munition Manufacturer

XVIII FOOD AND THE WAR WORKER 179
Collated by the Editorial Staff of SYSTEM, the Magazine of Business

XIX WOMEN AND WAR WORK 186
Collated by the Editorial Staff of SYSTEM, the Magazine of Business

PART ONE

POINTERS FROM ABROAD THAT WILL HELP

CHAPTER I

ADJUSTING A BUSINESS TO WAR-TIME CONDITIONS

By T. J. ZIMMERMAN
Managing Editor, The British Edition of SYSTEM, the Magazine of Business

Here you read exactly how a British business—the Watford Manufacturing Company, Ltd., of Watford, England—has met the new conditions and the sudden problems that the war brought. This concern's sources of raw materials, its labor situation, merchandising conditions and consuming market happen to be such that it had to meet most of the usual, and many of the more unusual, obstacles and problems brought about by the war. New conditions presented themselves and complications arose, readjustments were made, and new methods applied in every department and every phase of its organization.

These changes and readjustments and new methods are described under six headings. That these correspond more or less to the usual divisions of commercial activity is a significant indication of the all-embracing effect of war on any business. It is because the experience of this business is so especially typical and complete that it has been selected as the subject for this chapter. For since British industrial developments of the last three years may soon be paralleled in this country, the methods by which one firm successfully met them and solved its war-time problems will be of value and of direct use to every American business man.

LABOR shortage and difficulty of getting certain raw materials are usually the first bombshells that war throws into a business. Perhaps the management takes steps to meet these emergencies at once as they arise. But it soon discovers that nearly all these temporary adjustments finally lead back to the product and that it is the product which first of all must be brought into line, and adjusted to fit war-time conditions.

Before the war this factory was divided into two principal producing departments: cocoa and chocolate products, packaged foods. But its lines were extremely diversified: cocoa, in one grade but several package sizes; chocolate, in the form of food chocolate, plain confection known as the chocolate bar, and high grade confectionery chocolates and bonbons—all issuing as myriad lines, in different quantities and brands with various-sized packages in each, and a large assortment of specialities and novelties and private brands; and finally, the food line made up of a score of table delicacies, again in various grades and prices and sizes of packet.

1. Changes in the Product: Now, war brings pressure on the product from five directions: Raw materials rise in price, become scarce and are impossible to secure. As a result some products must be dropped, the others changed as to ingredients or quality or size or price.

The Government steps in and forbids the manufacture of certain goods—because their ingredients are needed for a national purpose, or perhaps because they are luxuries and can be dispensed with.

The Government is a big consumer itself and may make demands which must be filled to the exclusion of the general public's wants.

The loss of skilled employees may make it difficult to continue certain manufactures dependent upon their skill, or practically so.

Changes occur in the distributing trade or in the consuming demand as a result of war's myriad ramifications which reduce the demand for one line, increase another, or create an entirely new demand.

The first effect on the product of these five factors operating through far-sighted management policies, was a drastic reduction in the number of lines manufactured. The cocoa and chocolate department of the

factory alone was reduced from making a hundred and one lines, issued in hundreds of packages, to three issued in about a dozen packages. Why and how this was done is of significance to every business, no matter how large or small, or what its line.

The confectionery line was extremely diversified, which meant carrying a big stock of both products and containers with consequent storage room and administration and merchandising complications. It required highly skilled hand labor in large numbers and much space and equipment in making. And it was a luxury—so much so that the Government soon prohibited the making of chocolates above a certain price range.

Government regulations from the outside, and from the inside shortage of skilled labor and raw materials plus the management's desire to simplify, led to the elimination of the entire confectionery line. At one sweep nearly a hundred lines representing hundreds of different items were wiped off the firm's list.

In the plain and food chocolate line production was reduced to two simple items—the chocolate bar made in one grade and size and drinking chocolate in a single form; and the whole output is devoted to Government requirements—the trade gets none.

No change was made in cocoa—in fact, its output was increased, and for equally significant reasons: its production is simple, it is made in one line only, it is a standard food, the Government has made heavy requisitions of it; consequently the manufacturing facilities released by the closing down of other lines were devoted to this staple, and to another new and equally simple and staple line—soups.

Six advantageous consequences immediately followed from this evolution, each one making toward greater simplification of products.

Less labor was required per ton of product, so solving the general labor shortage.

Processes could be highly standardized, reduced to foolproof routine and fixed sequence, so making it possible for green workers to be used and meeting the loss of skilled men joining the army.

The standardization enables the company with a staff smaller by one third, with an average lower-priced product, and with far fewer lines, so to increase its output tonnage as still to maintain its volume of turnover.

These changes in the product also had their effect on buying and stocking policies: reducing the number of lines eliminated the necessity of buying, and carrying stocks of, a long list of materials.

Simplification of lines also has involved carrying a much smaller stock of finished goods. Formerly a complete stock of all the hundred-odd lines and the hundreds of packages had to be kept for the immediate filling of trade orders: now only a moderate stock of the very few standard lines still sold through the trade is required, and there is virtually no stocking of Government goods—it is shipped as produced. The ramifications of this factor are tremendous—it means a great reduction in the stock of containers, packing materials, advertising literature, and so on.

And finally the industry was changed from a luxury business to a food producer and from a maker of specialities to a maker of staple and war necessities—an important factor in maintaining a business in war time.

To the business man with an eye on preserving his trade connection and good will, the disposal of so much of the factory's output to the Government, and the total

withdrawal of certain lines from the trade and the consuming public, might see mistaken policy. But that very policy has helped to keep the factory's machinery turning, for, certain of the raw materials required are Government-controlled and only a very small quantity can be secured and therefore only a small turnover is possible unless the ultimate product is to be used for Government or national purposes.

The first advice, therefore, that this firm would give for meeting war-time conditions is:

> Go through your entire list of products; eliminate whatever you can—the hard sellers, the products that are handled in small quantities, that have no broad demand, that carry frills in manufacturing or require exceptional skill and attention, that are not trade necessities in your line, that can be replaced by more staple items. Get away from luxury lines—put your product into class of war necessities or trade staples. Reduce variations in each line—especially where there is variation for its own sake. Reduce the assortments especially as to variety in size and make-up of package. Then simplify and standardize—both the lines you make and the process of making. All this will help you to offset increased costs, carry on with less workers, release men for war work, carry on with green help, meet the demand for more staple goods and so hold your trade connections together.

The enforced use of substitutes or new ingredients marks the second change in the product. Certain materials are obtainable only in small quantities or not at all, or their cost has become prohibitive. Substitutes must be found. In food manufacturing a certain nutritive value, standard of quality, and uniformity of taste and appearance must be maintained. This com-

pany's substitution policy has therefore been conservative and carefully applied; its point of view is expressed in its using the term "alternatives" rather than "substitutes," when referring to the new ingredients it uses.

The purchasing department by constant search, the experimental department by constant research, must find these new materials. Because they have not had this seeking-alternatives policy, too many businesses have simply gone ahead buying the old ingredients at any price and with almost any quality variations, or stopped manufacturing the line. But just as in the first place this company carefully analyzed the items in its line of products to see what could be eliminated, so here analysis was applied to raw materials required, present stocks and future supplies were calculated, and a tabulation made of the possibly necessary alternatives to be sought.

In this business, for instance, Japanese rice farina has replaced Dutch potato farina; a substitute has been found for tartaric acid; proportions of the ingredients going into a product have been changed, as supplies demanded or cost increased disproportionately; cardboard has replaced tin and wood in packing.

HERE ARE SOME LOGICAL REASONS FOR INCREASED WAR-TIME EXPENDITURE

This company believes that at the present time money can be invested to great profit and benefit in research and experimenting for new products, for research has not only produced satisfactory alternative materials, but it has even brought to light ingredients and processes that are better than the former standards and will be maintained even when the old materials are once more available. The experimental department must work far ahead of product needs, experimenting continually and seeking new ingredients at every point of manufacture, never missing a chance for improvement.

This scene may surprise you, but it has ceased to startle those who regularly pass a London department store. In the chapter beginning on page 37, Lord Leverhulme gives some interesting pointers on war-time working clothes for women.

Even British girls attending colleges are rendering war service. Here students at Bedford College are figuring the velocity and curve of shells for our associates' artillery gunners.

These British women are doing drafting work ordinarily handled by men. As the war labor problem becomes acute in this country women will no doubt be called on to perform similar tasks.

The war has also brought changes in the form in which the product is put before the public—in the packing and the package. Economy is the chief aim here—economy in the cost of the package and also in the labor of packing. This factory made a conscious and thorough analysis of all its packages and packing methods, and went to the limit in securing economy and simplicity.

Some of the foods, for instance, were being placed in tin containers with a colored label pasted on. Tin is now almost impossible to obtain for commercial use, paper is scarce, printing is expensive. A container was sought which has only the top and bottom of metal; the cylinder is of paper board either directly printed upon or with an exceedingly modest label wrapper. Many powdered goods are now being placed in all-paper cartons with a waxed paper lining approximating the function of the former tin. These cartons again have been simplified; formerly three or even more separate wrappings have been required; these have been reduced to two, and even for this special machinery has been adopted in order to do away with hand work. As an extreme instance of how far this analysis for economy has gone: round containers have given place to square because when packed in cases by the dozen the round container wastes a certain proportion of the cubic space and therefore requires a larger case, which means more timber, more storage space, and more carriage cost.

Just as the public need no longer have its appetite whetted by specialties and its interest fanned by novelties, so this company has concluded that the buyer does not expect the former variety and expense and frills in containers. In chocolate bars, for instance, wooden boxes, embossing, and multicolored printings, wrappings and linings, have been done away with—all those little frills that did not improve or preserve the product, but were merely for looks. As little money has been spent

on the dress of the product as is necessary to furnish a container that will keep the goods in good condition and give an appetizing aspect.

All these changes in the product which have been described have a certain cost-saving effect; the increased costs is a production problem vital enough to require the management's specific consideration. Five courses may be followed to meet rising costs—in this business they have been followed, one after the other, as successive cost-increases compelled them:

1. Reduce cost of manufacture—the labor and overhead factors.
2. Find new materials to replace present high-priced ones.
3. Reduce the amount given for a standard price.
4. Increase the selling price.
5. Introduce a new line, priced to meet current costs.

Naturally economy in the processes of manufacture is the first step to take in meeting increased costs because it involves least change in the goods. The product readjustments already described themselves effected most of these economies. Cutting out packing frills and cheapening containers went far to meet initial rises in materials. Frills in manufacture also were dropped; for instance, chocolate bars may have certain markings that involve an extra dab or two, perhaps a slight waste of material; infinitesimal individually, in the aggregate considerable labor and material may be saved by eliminating them. Every part of every product has been put under a searching analysis in an attempt to discover all such sources of saving.

Still more did the elimination of diversified lines and specialties reduce cost of manufacture by allowing greater standardization. Bigger output of fewer lines

highly standardized as to processes, produced month by month without interruption, bring about a greater production per unit of labor and machine and overhead. This allows an equal concentration of study on production methods, resulting in many improvements of machinery and machine arrangement, of processes and packing. (How labor in turn was made more productive and helped to reduce cost will be described in the section of this chapter devoted to the labor problem.)

Then, inevitably, as the supply of goods receded below the consuming demand, many of the indirect selling expenses could be dropped. This does not mean that advertising was reduced or the sales staff cut down or selling effort retarded. But all those indirect expenses that pressure to sell require, that competition necessitates, that are designed to cater to the consumer's caprice or what he desires, that seek expansion merely for expansion's sake, were dropped. Reduction of lines and simplification likewise reduce overhead expense.

And, as has been pointed out already, many of the products that were eliminated were the narrow margin, hard to sell, speculative lines; dropping these automatically reduced expense percentages.

AFTER YOU HAVE SCREWED PRODUCTION TO THE HIGHEST NOTCH—WHAT THEN?

All these economies stop short of a variation in intrinsic value. When economy has reached this point, however—when every possible substitute material is being used, when labor has been screwed up to the highest efficiency and standardization carried to the limit—then if rising costs go beyond there come changes in product or price, which are rather a decision of sales policy than of production. The management is faced with the necessity of increasing the cost of the goods to the consumer. This can be done by raising the price, giving less in

quantity or quality for the same money, or establishing a fresh line with new price standards. All these were used by this company, and they were taken up more or less in the order named.

The management believes that the psychology of increasing the price to the consumer is, by using the economy methods described, to put off increases as long as possible so that both the trade and the consumer will have experienced rising prices in other directions and probably in competitive lines, and will therefore take the annoucement of increase in this line as a matter of course and with but little resentment.

HERE IS HOW ONE DIFFICULT PROBLEM WAS HANDLED EFFECTIVELY

The real problem has been in determining just what form the increase should take in order not to upset trade customs and relations. It is not possible here to go into the complicated details of price standards in food lines. Certain units of price and quantity have become established as standards in packaged goods, and there is even relationship as between one product and another. The conveniences and customs and usages of the trade must always be considered. And even though all the manufacturers in one line raise their prices uniformly there is a limit, in that a point is reached where the consumer will think he is not getting value and will buy entirely different product as a substitute.

The sales department and the producing department must determine, from their knowledge of the trade, in each instance whether it is better to increase the price, or to maintain price levels and reduce quantity, or withdraw the brand and put the good will of the name on the shelf until normal conditions return and establish a new brand whose ingredients and price shall accord with material obtainable. In this business, speaking

broadly, after all possible economies had been made, prices were increased within reason; that is, for instance, from 2 cents to 3 cents, and so on. Then the new prices were retained but weight was reduced. When costs still continued increasing it was found necessary to put new lines on the market made perhaps from somewhat different materials and with a new schedule of weights and prices to correspond.

2. Changes in Sales Policy and Methods: Even though demand is so related to supply that goods do not have to be sold, distribution always is necessary. It may therefore be said that while in a staple line selling effort has decreased because there was an undersupply of goods, the work of regulating distribution has increased. The wise business chief perhaps fears more an excess of customers' demands above his supply, than a surplus of goods above demand. While his profits may suffer temporarily from the latter, in the former case good will is imperiled.

The war has brought the former situation in most businesses. In this factory reduction of lines and lesser volume of those retained available for the trade, and constant excess of orders, has made fair and equitable distribution the chief problem of the sales department. Along with this has come the task of keeping the trade satisfied and customers held in spite of shortage of goods, and of conserving good will for the future.

But, chronologically, the first sales problem was readjusting the selling staff. Before the war the company had three sets of travelers: one carrying cocoa and food products to grocers; a second handling the higher-priced confectionery through specialty shops and departmental stores; and a third representing all lines. Each territory was covered by two and sometimes three men. The drastic reduction of lines helped solve the man-problem

when nearly half the travelers had to be released for military service; for each traveler could carry all lines and cover his territory alone. Wives of enlisting travelers could if they wished take in their husbands' territory, and in any event, they were given a maintenance allowance. As a result of this policy only one new traveler has been added; the regular salesmen, familiar with the company's policies and goods, have been able to carry on, and that successfully.

Because the travelers had to become familiar with new lines and new trade connections, and because supplies and deliveries and prices were much more uncertain than in normal times, the sales management has had to give a more definite training to the salesman, keep them better informed, exercise closer supervision over them, and come into more direct contact with them than heretofore. Certain definite methods have been followed to secure these results.

Nearly every day the sales manager sends a letter to each traveler—a personal communication of news, advice and information. Whenever any change is notified—as to price, temporary shortage, permanent dropping of lines, and so on—it is formally set down on a separate sheet so that the traveler can show it to customers and file it permanently in a looseleaf book kept for this purpose. Then a weekly meeting of all salesmen within easy reach of the head office is held every Saturday morning. Half of the session is devoted to business demanding immediate attention—developments in the business, new policies to be inaugurated, announcement to be carried to the trade. The latter half of the meeting is used to carry on a regular course of staff training; talks are given by the manager or outside experts on selling methods, health, personal efficiency, and so on; at one period a regular course in salesmanship was carried through.

The travelers have not only had to be educated to new lines and territories and constant changes in the trade situation, but also to a new selling point of view. It is not today a question of pushing for orders and meeting competition and increasing sales; it is a matter of keeping in touch with dealers to the end that the restricted supply shall be fairly distributed; that each dealer's position with his customers shall be safeguarded and thereby his good will retained by the company. This latter point must enter into all decisions that the management has to make as to changes in product and prices, discontinuance of lines, reduction of orders and so on. The more the traveler can work with the trade, can get its advice and meet its wishes in these changes, the better. That is why the management has been particularly careful to keep the sales staff informed up to the minute of any changes and so to minimize disappointments or complaints or claims on the part of the trade.

A COMPARATIVELY NEW PROBLEM AND HOW TO HANDLE IT

The problem of cutting down customers' orders is a new one in most businesses. The easiest way to refuse orders is not to take them in the first place; therefore keep salesmen informed. When orders have to be reduced at the head office, however, the first aim is always so to deal with a customer as to retain his good will. It is not merely a question of cutting all orders proportionately; the sales manager should judge every dealer's situation individually as he knows the circumstances; for instance, if a big munition works has been established in a town, it is not fair to reduce the supplies to the dealers of that town to the same extent as of those who are in an unexpanding territory. And the lagging of supply behind demand can even be taken advantage of: dealers who are financially weak or slow payers, or

intermittent buyers, or "sharp practicers" or unsatisfactory from any point of view, can be dropped. In every instance when an order is cut down, not only is the traveler notified so that he can take up the situation personally, but a special letter is written to the customer giving a complete and tactful explanation.

There is one new market to which the sales department has applied itself with all its old time salesmanship: orders from the Government. It is high patriottism and good business to supply the Government departments with everything they want. Selling to the Government primarily is a question of commencing—that is the point at which real salesmanship is necessary; after that it is a question of giving prompt quotation, keeping in close touch with the Government's requirements, and making deliveries to schedule.

One man in the London branch office who has particular qualifications for just this task devotes his time entirely to Government orders, but even though almost all Government orders are placed from the Central Government Office yet the requisitions often originate at other points in the country where there are Government units, and therefore other of the travelers also must be trained to the right handling of Government work.

The policy of maintaining more personal contact with salesmen, dealers and customers, has led to the publishing of a "house organ" designed to appeal to four groups of people: the factory staff, the salesmen, the trade, and a further circle composed of shareholders, health officers, big consumers, and the like. The object of this house organ is to maintain good will and establish the standing of the company and spread a knowledge of its policies and ideals among an influential circle.

The other advertising of the company has been maintained in spite of the fact that demand exceeds supply. The motive again is to maintain the established good

will and also to extend the prestige of the firm and build up a certain favorable identity for it in the public mind.

All in all, the sales department, probably more than any other department in the business, must in all its war-time activities keep one watchful eye upon the future, upon maintaining its trade connections and good will of its buyers. The business which through the exigencies of war allows itself to be withdrawn so far out of its regular trade orbit as to make a return to its normal course of trade too difficult, is creating a serious post-war situation for itself. It is for the sales department to maintain a vigilant eye on this problem.

3. The Labor Problems of War Time: The labor problems of all businesses in war time resolve themselves down to these:

1. Replacing skilled workers who have been drawn into war service
2. Substituting women for men
3. Training new workers
4. Meeting increase in wages
5. Holding employees in the face of competition for their services

The labor problem in one of the departments of this company is typical of the whole business. It illustrates most clearly the great changes that war brings in the labor situation, and the methods that have proved successful in meeting these changes. It shows, too, how this labor readjustment makes changes necessary throughout nearly every detail of the organization and producing operations of the business.

Before the war this one department was making over 100 lines; 600 people were employed—150 men and 450 women. Today only three lines are being produced; the tonnage exceeds the pre-war output and the money turn-

over at least equals it; yet today the department employs only 400 people, of whom but 23 are men, mostly over military age.

Male labor, therefore, has virtually disappeared from the department, for of these 23 men 10 are charge hands or foreman, others are old experts whose skill is being employed in experimental work or in training; only two or three out of the original 150 men are doing their former work—these exceptionally heavy jobs which it is best for women not to do.

Now, such a change cannot be accomplished merely by pitchforking women into men's jobs. This successful substitution has been a fivefold problem; of selecting the right women, readjusting the wage basis, giving them proper training, reorganizing the work from a new point of view, giving the right working conditions and environment, and arranging proper supervision.

The best women for men's jobs have been found among the original female staff, and three motives operated to influence women to do men's work: the patriotic impulse, desire to help out the company, incentive of more pay. Naturally the second motive could inspire only those who were already in the employ of the company; the management felt also that any positions with higher pay should first be offered to old employes, and that its previous knowledge of them gave it the best assurance of their capabilities for the new work. The department head, therefore, in the first instance, went to each foreman and forewoman and told them what his plan was and asked them to gather the girls together for an informal meeting.

He then frankly presented the situation to the rank and file, and described the work that was to be done, not minimizing the difficulty of the work, but explaining the requirements as to physique and knowledge and responsibility. Then he dwelt on the motives: he pointed out that the new work would carry an immediately better

wage and would probably lead to additional increases; he emphasized particularly the desire of the company to release all men possible for military service and to replace them by promotions from within and thus give the present staff these better-paid jobs—an eminently fair proposition all the workers agreed.

Then he asked for volunteers—and more than sufficient offered themselves. Those not needed at once were called upon as men left. When the first list of volunteers was exhausted no further meetings were held, but the forepeople were asked to tell their staff of the further need and to select the fittest of those who volunteered.

It is significant that the volunteering was intelligent—that is, those who offered themselves usually proved capable and have made good in men's work. Not necessarily the big and strong women turned out best, even for the heavy work; but rather those physically fit and at the same time alert and intelligent and enterprising. All in all, this policy of selection from existing women employees for certain types of work through the volunteer system has been a marked success.

These women were paid more wages than they had been receiving and they fairly earned more. Before the war girls and women were doing principally packing work and any light labor or hand work in manufacturing. They earned from 18/- per week up, at a piecework rate. Immediately they were put upon the new work they were guaranteed from 21/- up; and as they improved—whether they were on day work or piece work—they gradually advanced until the average now runs up toward 30/-, which, compared with the prewar wages of women in this industry, is looked upon as exceeding good. (It must be remembered in considering this wage scale that while one shilling equals 24 cents, its standard of value and purchasing power in England before the war was equal to 40 cents).

Almost never do women turn out the same volume of heavy and skilled work as men. At the beginning it was calculated that two women would be required to do one man's work, and it was because the men were getting a minimum 42/- a week that the women were given 21/- at the start. It has worked out, however, that on the average five women are required to do the work three men did before. As they are receiving about half as much, wages per unit of output are slightly less than before; but when the additional overhead expense of taking care of more workers is considered the cost per unit of output is almost the same. It should be noted, however, that the output per machine and therefore for an entire department is the same as before, for if six men were working on a certain group of machines they are replaced, not by six women turning out 60% as much work, but by ten women turning out the old volume.

In certain classes of work especially if similar to what they have done before, women turn out quite as much as the men did. In one packing section, for instance, where 40 men worked before, one man supervisor with 50 girls is now turning out the same output; and the girl's wages have increased from the 16/- they were earning at light packing to 28/- a week.

The work had to be reorganized considerably when women were introduced. The most helpful factor was the reduction of the lines manufactured to three simple and staple products. Probably all the processes involved in the old line could have been carried on by women, but at any rate their introduction would have been much more difficult. The simplifying of processes, the reduction in variations, adjustments and attachments to machines to aid the worker, far greater standardization and a more careful analysis of operations so as to reduce responsibility and necessity for individual skill and the

liability to mistakes—this was all done before women were introduced largely into the work.

Training the women for their new work was well carried out so that the work suffered no interruption, the women went through no unproductive period, and the men gradually passed their skill over to them. As the women already knew the product and its succession of processes, were familiar with the factory routine and production policies of the company, the newcomer's usual "breaking in" was not so necessary. They did, however, have to be taught the definite work each was to perform; and the circumstance that the men were called away gradually, a few at a time, with considerable advance notice, allowed the women to be brought in just as gradually. And this proved one of the prime factors in the success of the scheme. The newcomer was not put immediately at working a machine; she worked around it, so to speak, as a helper, and had time to get over her "machine shyness," to watch it and become familiar with its presence and its noise, to learn where it was harmless and where it should not be touched.

HOW WOMEN WORKERS WERE INTRODUCED INTO MACHINE WORK SUCCESSFULLY

Then she began to learn the actual machine operating —and again she was brought along very gradually. If, for instance, a group of six mixing machines previously had been operated by three skilled men and two helpers, and two men left, perhaps four new girls were brought in and the work was so redivided that the women for two or three months did the simpler and the lighter part of the work only. Gradually as one man after the other of the group left, these women would take on the heavier and more skilled parts of the work and new girls would be introduced, until at the end the entire squad would be composed of women.

This is particularly important in any processing or mixing work, for whatever may be the formulae and definite instructions and fixed routine according to which the worker operates, there still is left a considerable margin where the operator's skill and experience and intuition must rule. It is this great difficulty of introducing new workers that has been successfully met by this slow "breaking in" and partial dilution plan. There have been several operations where nearly a year has been required for the new women workers finally to take over the entire control and responsibility.

THIS PLAN FOR GETTING WOMEN'S COOPERATION WAS EFFECTIVE

A better knowledge on the part of an employee of the policies and ideals of the management, of the processes of manufacture of the ingredients that go into the product, of standards of quality and a hundred other details of the business in general—such a knowledge would, the management believe, make a policy of substitution much easier. For this reason since the war a definite staff training plan has been introduced into the business consisting of lectures, school room work and fixed instruction, and the plan is to extend this gradually until the entire staff—both factory and office—will be educated to a knowledge of business as a whole, and to a knowledge of this business in particular. The company will then feel that it has within itself latent material for all the labor requirements that may arise.

So far as working conditions and supervision are concerned such substitution has led to three rules:

1. Put a woman over a woman
2. Introduce women into new work in groups
3. Adapt hours and environment to a woman's strength and temperament

One of the surest sources of failure in substituting women for men is to leave the same old foremen and male charge hands directly over the women as were over the men. The immediate superior of a woman worker should always be a woman, whether she be charge hand or a forewoman or a supervisor or what not. The planning, the final executive control and the responsibility for speeds and output may be left to men, but the "boss" that has first contact with the worker should be a woman.

This has led to a most interesting development in the use of forewomen. This business, like most others, was especially worried in the early days of the war over the possible loss of foremen and managers. Previously in most of the departments where women were employed there was a foreman and subforeman with female "charge hands" under them. In many cases it was found possible to move these assistants up into the subforemen's position; these women "charge hands" were also drawn from the ranks. And women have proved just as successful in doing men's managerial work as in doing their manual work.

This kind of promotion, again, cannot be done by hit-or-miss methods. The department manager must be very sure of his subforewoman before he promotes her into full foremanship, and both he and the forewoman should cooperate in keeping a close eye on the workers and should put certain tests to them in order to find the right type for executive positions. That indefinable thing called "executive ability," capacity for getting work done, willingness to take responsibility, must be looked for in these women and is manifested to the keen watcher by many little things in the course of a day's work.

Women have obtained better working conditions than men. In the course of standardizing operations and training workers numerous changes have been made in machinery arrangement; accessories have been added to

machines that have made the work easier; heavy lifting and cartage by the operators was reduced when women came; improvements have been made as to heat, fresh air, avoidance of standing strain, and so on.

Most significant of all has been the experience as to working hours. In one department are 30 girls doing the work that 20 men did before. They were working 55 hours in six days—10 hours five days a week and half a day on Saturday. There was some complaint of weariness and absences were considerable. The department manager talked the matter over with the forewoman and the workers, explained the situation fully and told them that if they could secure somewhere near the same output in five days of nine hours each their working time would be reduced and their wages maintained.

The scheme was put into effect and the immediate result was almost as big an output in 45 hours as in the previous 55 hours; absences decreased, and the workers' physical condition was better. The company had the advantage of running the department only five days a week with all the economy which that involved in the way of fuel, light and other overhead.

PERHAPS THIS "FLYING SQUAD" PLAN WOULD WORK AS WELL FOR YOU

One interesting element in this substitution plan is the formation of what is called the "Flying Squad." Naturally a factory which loses 90% of its men and perhaps some of its women workers, which is making drastic changes in its product and revolutionizing production methods, constantly is meeting sudden emergencies, especially in the way of labor demands: men are suddenly called up, promotion of women to men's work leaves awkward gaps, the government wants quick delivery of certain goods, raw material for orders long held suddenly arrives and needs to be processed at once. To supply such

labor demands the "Flying Squad" was organized, composed of women who had been in the factory many years, who had worked in nearly every department, and who supplied, as a group, experience and skill in all the processes of the factory. The members of this "Flying Squad" are subject to call at any time by any department for emergency work.

The substitution plan used in this factory itself has almost eliminated the problem constantly present in many businesses of wage increases. All employees are earning more, as they need to in order to meet rising prices, but it has not been necessary to increase piecework rates. The substitution of women for men naturally increased the women's earnings; standardizing and improvements in operation and methods has enabled nearly all piece workers to increase their output and therefore their wages. The consequent bigger output per worker and machine keeps the percentage of indirect labor and overhead as before, even though individual wages may have to be raised. The old lesson that increased wages do not necessarily mean increased production, but that right planning and improvements in machinery and method can be made to offset higher wages—has been proved over and over again by war-time conditions.

4. Changes in Buying Policies and Methods: The buying department has had to adjust itself to the facts that:

Prices of all commodities have increased.

Markets have been dislocated by the difficulty of getting the normal volume of supplies, by the shutting off of some sources, by restrictions on imports of some commodities.

On account of shipping difficulties and delays in transportation, more time must be allowed for even comparatively short distance deliveries.

New sources of supply have to be found to replace those shut off entirely, new commodities to replace such as have disappeared from the market or are no longer available.

These market conditions have produced these revolutions in buying methods, and the buyer's point of view.

1. The market no longer is a buyer's market; it now is controlled by the seller. The seller formerly went to the buyer to present his goods and ask that they be taken; now the buyer goes to the seller and asks for goods. The situation is therefore the precise antithesis of formerly: the man who before was the seeker now waits; while the buyer, who previously sat back and waited for the supplies, is now the seeker.

This naturally must change the point of view and the course of action of the buyer. He must be more active, he must constantly seek new sources of supply, he must keep himself closely informed of the supplies that are offered on the market, he must have such relations with supplying firms that he will be favored when they have the goods. In this business one member of the purchasing department now spends all his time "in the market," among suppliers.

2. The buyer must be in a position quickly to change his specifications and demands in accordance with supplies. In the old days he could insist not only upon a certain commodity but upon a certain brand and standard. Now he must acquaint himself so thoroughly with the various supplies available on the one hand, and with the needs of his factory on the other, that he can seek out and accept a brand or standard varying from the former line in one way or another. Going to the extreme, he may even have to purchase an alternative material—a commodity wholely different from the former but capable of taking its place.

3. Whether a buyer should concentrate on one source of supply or divide his orders for the same commodity among several supplying houses has always been a subject for argument. Whatever may be the facts in peace time, it is the experience of this firm that under war conditions the only safe plan is not to center on one source of supply, for there are too many contingencies which may suddenly shut down that source.

The policy has been to buy consistently from a seller so long as he can supply the goods, but to become a regular customer of as many suppliers in every line as the size of the orders may warrant. The reason for this is not at all what it is in peace time—to get a lower price by playing off one firm against another—but purely to insure a sufficiency of goods.

HERE ARE CONDITIONS THE BUYER MUST MEET

4. Under present conditions the buyer must meet the demands and the convenience of the seller and must give favors instead of receiving them; it is now for the buyer to make himself attractive to the seller. This manifests itself in several directions. It is well for the buyer in war time to be much more punctilious about payments. Just as in normal times a buyer places his orders with firms on whose promises he can rely, whose deliveries are prompt and whose personal service is good, in war time the seller will accept orders from and make deliveries to such firms as pay promptly, take deliveries when he wants to make them, and meet his convenience in various ways.

Whatever the terms of payment with the seller it is policy to pay on the dot; better still to offer to pay on delivery. This particular business has even succeeded in securing supplies by applying in advance or by help-

Industries	Number of persons employed before the outbreak of the war	Number of persons employed on—				Percentage of normal number employed on—			
		Aug. 1, 1914	Jan. 1, 1915	Jan. 1, 1916	Apr. 1, 1916	Aug. 1, 1914	Jan. 1, 1915	Jan. 1, 1916	Apr. 1, 1916
Food products	107,094	45,418	70,973	87,717	87,726	42	66	82	82
Chemical industries	89,335	37,836	57,948	78,233	79,847	42	65	88	89
Rubber, paper and cardboard	63,780	21,522	32,965	44,559	45,798	34	52	70	72
Printing and publishing	46,638	14,919	18,883	21,615	22,465	32	40	46	45
Textile industries	408,599	133,765	246,284	303,296	305,392	33	60	74	76
Clothing, millinery, etc	145,524	48,880	85,077	104,646	110,878	34	58	72	79
Hides and leather	63,701	23,570	39,159	49,626	50,630	37	61	78	78
Woodworking	102,987	19,795	38,173	55,705	60,093	19	37	54	58
Metal industries, base	448,178	141,832	274,422	466,022	496,166	32	61	104	111
Fine metals	11,240	983	2,036	3,738	4,071	9	18	33	36
Precious stones	2,620	414	820	1,247	1,251	16	31	48	48
Building trades	73,882	15,599	19,475	29,977	34,935	21	26	41	47
Stoneware, earthenware and glassware	75,708	13,809	24,877	33,118	34,084	18	33	44	45
Transportation and storage	33,013	15,368	20,288	26,834	28,103	47	61	81	85
Miscellaneous commercial establishments	93,135	45,999	51,625	59,824	61,844	49	55	64	66
All industries	1,765,434	579,709	983,005	1,366,157	1,423,283	33	56	77	81

This table, based upon an investigation made by the French Labor Office, indicates what industries are likely to suffer most from the war. It shows the percentage of employees in each industry after two years of war as compared with normal times. Of course, it is a logical assumption that after allowing for any increases in prices, the volume of business being transacted is in proportion to the number of employees. You will note that certain industries, particularly those engaged in making non-necessities or luxuries, show the greatest decline. For example, millinery, jewelry, glassware, and woodwork (which includes furniture) show marked declines, whereas the metal industry shows an increase.

ing the supplier, who may be a middleman, to finance the purchase of the goods that are required.

Take coal, for instance. The factory safeguarded its winter supply, which called for monthly deliveries from the coal dealer, by helping the dealer financially so that he could bring into his own yards far in advance the factory's entire supply.

When the buyer goes out into the open market to purchase goods, as often happens in the case of raw materials imported in bulk, it is advantageous to him to be in a position when he looks over the goods wherever they may be, to order his supply and hand over the money on the spot and order immediate delivery of the goods by the seller.

Delivery is another instance where the buyer can make himself attractive to the seller. In pre-war days buyers sought to carry as small a stock as possible and to take frequent deliveries in small lots. This is inconvenient to the seller in that he must warehouse the goods, carry his investment in them, increase his clerical work by more frequent and smaller deliveries, and take on risks and expenses in other directions. Many a buyer has secured goods in these times by taking delivery of his entire order at once or within a short period.

The most successful buyer now is the one who works in a close and frank and personal relation with his suppliers. It is not so much a question of getting prices, of using the old time strategies and "jockeyings" in order to make an advantageous "deal." Frankness and fair play and the cooperative spirit form the best basis on which a buyer can deal with a seller. There is a "service" ideal in buying just as there is in production and selling. Buyers can render sellers a service they appreciate and need in helping them to operate their businesses more conveniently and to the greatest advantage both to the individual and the state.

5. Changes in Management Methods and Point of View: To meet war time conditions successfully it is not enough to make adjustments and change methods that directly affected spots here and there. So radical and all-pervasive has been the effect of this war on business that marked changes in management point of view and policy are required. This business has found that these necessary changes group themselves into about these five phases of management.

First, war-time conditions have bared the interdependence of the various elements and departments of business. This has resulted in methods which, recognizing these close relationships, seek to harmonize and facilitate interdependence, to gain by it.

The adoption of the "committee system" is perhaps the most important and radical of them. Before the war the situation more or less was that the managing director supervised the entire business and that each department head managed his department almost as an independent concern. So long as everything goes smoothly such isolation of departments may have no glaringly bad results. But when old employees leave and the staff is short, materials scarce, deliveries uncertain, changes frequent, emergencies sudden and readjustments imperative—then the weaknesses of decentralization are exposed and interdependence made apparent.

The committee system was therefore introduced into this business most completely, from the board of directors at the top down to committees responsible for minor phases of the business. These committees are definite, have fixed responsibilities, deal with all affairs, make decisions, and see that they are carried out. This system keeps all the affairs of the business in full view and under tight reign, considers any detail in relation to the other parts of the business, familiarizes managers with all the activities of the company, and takes advantage of

interdependence by making it generate cooperative effort and general efficiency.

The staff training system which has been started is also in part due to recognition of interdependence—realization that the more an employee knows about this business and all business, the more efficient and profitable he is to the business.

The increased emphasis on knowledge of costs and more complete records of all kinds also is due to the realization that to carry on any department rightly accurate knowledge of many facts outside of its own particular bailiwick sometimes is necessary. The sales department must, for example, know costs exactly in order to sell goods profitably and the production department needs to know future demand in order to lay out the most effective schedule.

SOME PLANS THAT HELPED TO BUILD A KEEN ESPRIT DE CORPS

Another aspect of this same question has been the giving of a conscious impetus to the get-together spirit of the whole institution. There has been a closer drawing together on the part of the staff and a desire to cooperate and be mutually helpful—a realization of their interdependence; that the whole business is one and that every individual is interested in the whole business. The result has been the establishment of employees' clubs, the holding of social affairs for the staff, the introduction of dining rooms and recreation rooms which bring them together. Promotion from the ranks and staff training and the committee system also have helped to spread this point of view among employees.

Second, the upsetting of all former conditions as to raw materials, costs, and expense standards, has fixed the attention of the management on the great value of accurate costs. Costing and recosting, keeping continuous

records of costs, taking nothing for granted—that has been found to be the only safe policy. More than ever, management decisions as to what products to manufacture, in what size units, at what prices to market, what terms to give, have been made dependent wholly on cost figures. The costing department has been made creative; it has been put on a par with the production and buying and research departments in the task of adjusting the product and production methods to the new conditions.

The third point is enhanced appreciation of the value of standardization and its consequent manifold application. The management's desire to expand, the caprice of the trade and the consumer, the striving for novelty—all these had in the past drawn production away from the basic principle of making a good article at lowest cost. When the war compelled the reduction of lines and the cutting out of frills, it was suddenly discovered how advantageously standardization affected costs and production problems and the routine of business. And, therefore, beginning with the standardization of manufacturing processes, this principle has been carried into all the activities of the business.

This brings us to the fourth point. The many readjustments and consequent new methods that had to be introduced, shifted the management point of view from one of reserve and adherence to tradition and former experience to a more open-minded and unprejudiced and willing-to-try-and-learn attitude. It can truly be said that women supervisors, a 45-hour week, staff training, and a committee system were not introduced as a direct result of war conditions, but rather came about indirectly as a result of this changed point of view.

And, finally, the management point of view has been radically changed toward the human factor in business. In many British businesses before the war, employees—men and women, boys and girls—were taken as they

were; the supply exceeded the demand; one could always get approximately one's requirements and one had a selection from which to choose. War has made it necessary to look upon the employee not as to what he is, but as to what he might become—to study the latent possibilities of employees in order to find the abilities that are required and then to develop these latent abilities, not only for the company's good, but also to the resultant benefit of the employee.

One can follow this idea up many interesting paths. So far as staff training is concerned this company realizes that only by helping the employee to make the most of himself can it get the best out of him for itself. The only way the management can find in employees an interest in the business is by giving them such tasks and responsibilities, chances of development and feelings of proprietorship, as will arouse such an interest in them. Efficiency can be made to pay only by paying for it.

HELPING WORKER TO HELP THEMSELVES IS HANDLED THIS WAY

In brief, the employee must be known not as a "hand" or a number on a time clock, but as a human being entitled to individual treatment and personal consideration. The effect has been in this company, as in so many others since the war began, betterment of working conditions, extension of welfare work, staff training, increased wages, closer and more human staff organization. It almost seems as though, just as one discovers the worth of many things only when they become rare, so employers have discovered the value of workpeople individually only as they have become more scarce.

The financial policy has four aspects—first, toward current expenses; second, toward fixed investments; third, toward locking up money in stocks; and fourth, toward terms to customers.

6. Changes in Financial Policies: The first point in financial policy to which management gives attention in a great emergency is retrenchment and economies. Here a change has taken place opposite to what might have been anticipated. During the first few months of the war the general opinion was that it would result in a shrinkage of business and a consequent radical retrenchment of expense and outlay; the business world supposed its principal task would be to make economies and to save at every possible point.

But the policy of this business, just as it came to be in so many other war-successful British businesses, has been *not to retrench and not to emphasize economies.* The normal watchfulness over expense, the eternal striving to find better methods that will cut costs, and the necessity of making every penny count, were intensified, it is true. That is good management under any unsettled circumstances. But to carry on that very policy of cost reduction and to make the most of resources and to meet new conditions and to develop new methods, put out of consideration at once and at least during war time the retrenchment idea.

SOME VITAL POINTS THE WAR-TIME FINANCIAL POLICY SHOULD COVER

Wages were not cut down; rather attention was given to means of enabling employees to earn more. Outlay in the way of new machinery and better equipment and improved facilities was not reduced; it was increased, for only in that way could all cost-cutting possibilities be taken advantage of. Expenditure on welfare work, improved working conditions and staff betterment were increased, because only in that way could individual efficiency be raised. No cheese-paring policy was enforced; whatever was legitimately needed to carry on the business effectively—whether a waste basket for a

clerk or a new dynamo, whether an additional messenger in a subdepartment or a doubling in the costing staff—no blue pencil of requisitioning or expense occurred where there was excuse for none.

In short, based on the fact that the labor supply is short, material costs are high, that the output can easily be sold—the policy should be to concentrate upon getting the biggest output at the lowest per unit cost, to make labor as highly efficient as possible and to preserve the standing and good will and resources of the business, both inside and out.

So far as fixed investment is concerned, that point has really been covered in the above statement that expenditure which makes the mechanical and human equipment of the factory more efficient has not been curtailed. Raw materials, new construction, machinery and all equipment have been difficult to secure in the last year or two; within these restrictions, however, the policy has been to make all additions to plant and buildings that are required for proper extension.

Just as in matter of expenses the usual watchfulness over outgoings and the scrutiny of unprofitable lines should be intensified, so in dealing with customer's credits, war time is a good time to tighten the strings on doubtful accounts and unsatisfactory customers. On the other hand, this management believes that the policy of drastically shutting down credits and shortening trade terms is a wrong one; it has acted on the principle that a manufacturer has no right to upset his trade and inconvenience his customers by changing regular terms of payment. Nor is it wise, from the point of view of future good will, to take advantage of shortage of supplies to compel customers to give up their usual accommodation.

In the early days of the war, dealers who were hard-pressed were in fact given additional accommodation,

and a willingness to help out has been the attitude always taken toward the trade. Yet because the war has increased the circulation of money in Great Britain and has therefore gradually shortened the customary terms of payment throughout all business, there has naturally come about a shortening of terms of payment in this business. But the company itself has not at any time made a direct effort to change its terms to suit its own advantage only.

A business which needs money can secure it from three sources within itself: it can reduce capital outlay, curtail its credit to customers, or reduce its investment in stocks. It was this company's policy to realize no money from either the first or second source, and it greatly increased its investment in the third. More money therefore is required in proportion to turnover in war time than in peace time. The management believes that the additional capital required should be secured either by using reserves, putting profits back into the business, arranging for accommodation from banks, or securing additional capital for the business. The burden of financing should not be levied on the running organization nor upon the customers.

MAY I *suggest that it is worth a good deal to America to study our blunders, so as to begin where we now are, not where we were three years ago.*

LLOYD GEORGE
Premier of Great Britain

CHAPTER II

WHAT AMERICAN BUSINESS MEN CAN LEARN FROM BRITISH EXPERIENCE

By LORD LEVERHULME

Perhaps you could not find anyone better fitted to tell how business men in this country can prepare for war-time conditions than the man who wrote this article. For three years, as head of the largest English business of its kind, Lord Leverhulme has daily faced questions similar to those now rushing in on you. In 1885, Lord Leverhulme purchased a small soap factory at Warrington. The works had never been large, and the plant was in poor condition. It was not capable of producing 20 tons a week.

But Lord Leverhulme's ambition was to invent a new soap, and—no less important—to get a good name for it. He spent a good deal of his capital in experimenting during the first year, and finally invented a household soap. "Sunlight" was the name he chose for it, after long worry. From the first he astonished people by the ability of his advertising.

Now the firm of Lever Brothers is said to be the largest soap concern in the world. It has manufacturing centers in every continent, almost in every country, from Japan to America, from Australia to Belgium. It has also great enterprises for winning palm oil in the African forests, Nigeria, and Sierra Leone. It owns islands in the Pacific, and large areas in the Congo. Altogether, its employees number over 20,000.

GREAT BRITAIN has now been at war for more than three years; America for but one. This in itself signifies that the conditions under which your great nation has entered the war are totally different from those under which Great Britain entered it on August 4, 1914—different in the financial situation, in buying problems, in man-power, and in dangerous enterprises.

But in very many ways I think you can gain from our experience: particularly by avoiding our mistakes.

First as to the financial situation: I should say, judging from my own experience, that at the first shock of war it was the moratorium that saved the financial situation in this country. But for this, and for the organization of credit and capital, a volcanic economic eruption, nothing short of disastrous, would have occurred. Beyond that, the banks in England were most sincere and earnest in giving all the accommodation possible to their clients whose stock and caiptal were temporarily locked up in enemy countries; whose floating cargoes required financing; whose stocks at home required increasing; and whose general requirements were constantly demanding more and more capital. Had it not been for the sympathy of the banks, and their attitude of helpful cooperation, the trade and production of the country would have been seriously crippled, and in consequence the government would have been hindered in the collection of taxes and the raising of loans, perhaps to a disastrous extent.

It is on the continuance of our industries that the state itself depends. The state is always a pauper, without any actual reserve capital other than what is provided by acts of Parliament.

Therefore, it is absolutely essential to keep industries active, fully employed, and with ample capital at their disposal for the conduct of the business of the country. This the banks did most efficiently in the United Kingdom, and they thereby rendered a great service to the State, as well as to individual companies and manufacturers, not forgetting the workers themselves.

How will war affect your national money market? That is the first consideration. I do not think there is room for much further financial expansion. Money will move about between five and six per cent. The curious feature about the war has been that every country appears to have more money at its disposal after each

successive loan. The explanation of this is that the money is received from the lender, paid to the contractor, and sent back to the bank.

But, in spite of our full bank vaults, we have saddled ourselves with tremendous obligations. The situation is as if you drew $25 from your bank to lend to me; I might pay it out to someone else, in the form of salary perhaps: he would eventually perhaps put it back in his own bank or pay it to someone else's bank. But the obligation would still rest with me.

SOME EFFECTS OF THE WAR ON GENERAL BRITISH BUSINESS

The war has had a wonderfully stimulating effect on business generally, by increasing the circulation of money. The government is buying largely. The net income of the household has increased in most cases. Living is dearer, but people are living better, much more or less all round. Secondly, money remains relatively cheap, and is fairly easy to get. Credit is shortened for everyone, and the collecting of accounts is, therefore, comparatively easy.

You did not have our initial financial shock, because you had already adapted your financial structure to war conditions, and your entry into the war was foreseen, and could be approached with a plan. I am confident that our other financial experiences will be valuable to you; that the war will make money circulate even more rapidly than it now does in your country; that all trades connected with the production of war material will reap great prosperity; that the retailer will do well, especially if he knows how to adjust his business to the changing but not lessening demand, and adapts himself generally.

This also brings up the question of expansion, which under war conditions is difficult, for two reasons:

1. Because prices are high, and expansion is therefore costly;

2. Because in our case, at the present moment, our government has expressly forbidden the flotation of companies for the purpose of private trading. It has also to all intents and purposes, put a ban upon the increase of capital for private trading, in existing companies. The reason for this is, of course, that the government wants to turn the investment of new savings and new capital into either state securities or industries that produce for war purposes.

Looking ahead, therefore, to the possibility of a similar development on your side, it will be well for those of your firms which desire to expand, to make their financial arrangements as soon as possible, otherwise they may be unable to do anything, save by bankers' loans. This is one of the reasons why I would advise every American manufacturer, great or small, to husband his resources henceforth with the utmost severity.

After financing is dealt with, the most immediate problem is buying. I should not advise American buyers to lay in enormous amounts of stock at the present moment. The situation in America now is very different from that in which we found ourselves in the first months three years ago. We were then still able to buy at reasonable prices all over the world, but now, after three years of war, there cannot be any great upheaval on present prices in the United States, or throughout the world in consequence of your participation.

There was, at the beginning of the war, an enormous amount of speculation in America by representatives of the Central Powers, by many neutrals, and others who purchased supplies heavily with the idea that America would remain neutral, and that these supplies would be available for profiteering at a later date.

LORD LEVERHULME

"When this great war is over," says Lord Leverhulme, "a large voice in the rearrangement necessary should be given to labor." The Lever industries circle the globe and employ 20,000.

Women substituting for fighting men on heavy work often require special corsets if injury is to be avoided. This is the type of corset devised by Lever Brothers for women workers who work in the yards unloading heavy boxes of raw material. (See page 54.)

No doubt, if necessary, the government will come in, as it has frequently done here, and take these stocks. But the conditions are so different now to those prevailing three years ago, that it is difficult to draw any comparisons that are worth while.

The question of buying will become increasingly difficult as your army is enlarged. In this country we have, during the past three and a half years, frequently suffered great losses through unscientific buying. The one thing we have learned is this—in war time, cooperation and a coordinated policy in buying are essential in every industry, and to the state.

WHY COOPERATION BETWEEN BUSINESS MEN IS ESPECIALLY VALUABLE NOW

It will be well if your manufacturers will realize this at all times. Say to yourselves: "Raw material will be necessary for all of us, if we are going to continue to supply our customers. To buy in a panicky fashion means that we shall rush up the prices of raw materials to famine prices: and the result may easily be that some of us will get no supplies at all. Let us combine and disclose our present stocks, disclose our possible resources, disclose even our consumption. Then let us buy together and share the net product."

I may tell you quite frankly that we had some very bad experiences in England through unscientific competitive buying in the early days of the war. But at last, and very often with the aid of the government, we have practically settled this policy in our trade. But I must confess that we had to press our government very hard, and very closely to get what we wanted. And this brings up one important general proposition which underlies much that I am saying, and which should be emphasized first in this problem of buying wisely.

In many industries in this country, we have been able to make progress because German competition has been shut out. The same thing applies to certain American industries. An instance I might cite is the crushing of oil seeds and the refining of oil for edible oils. This was done in Germany before the war. But we had to learn to do it in order to get the oils necessary to the making of margarine and other foodstuffs.

But the point I would make is this—unless the employers concerned can combine to pool their knowledge of these new industries, they will lose the ground they have gained, after the war.

What we have to do, both here and in America, is to pool our information for the general good. If Bentham has spent £25,000 on experimenting and Williams and Company, a firm doing similar work, has spent only £2,000, it will still be up to Bentham to exchange his information with Williams and Company, for the benefit of the industry generally.

You understand the necessity for "getting together" better in America than we do in England. But you do not carry it, in spite of such excellent magazines as SYSTEM and FACTORY, nearly far enough. You do not approach the industrial interplay common to the German cartels. And I sincerely hope that you will begin here and now to disseminate information on methods much more sedulously in all your industries. Our success in the British soap industry is largely due to the manner in which all the principal firms have come together and compared notes.

This is the one method by which it is possible, not only to capture new ground, if I may so put it, but continually to push your outposts into enemy territory. Without this pooling of information you will find yourselves evacuating the trenches a few years after the declaration of peace. For the information at the dis-

posal of most German business houses is unique. The country boasting 600 cartels has just so many more mines of information at the disposal of its traders.

In your buying policy be under no delusion, however. So soon as you equip even 1,000,000 men for the field, you will come upon a scarcity of leather, of wool, of silk, and of various other materials used in the equipment and outfitting of the army.

All sorts of unsuspected shortages will be discovered in raw material. For you must remember that the drain on material has been going on for more than three years. And as soon as your military preparations put an extra tax on the productive capacity of the country you will feel the strain much more severely than you do now. For that reason, you must be prepared to lay out much more money than ever before in stock.

Your experience will be, in one sense, similar to our own. For you will have the same tremendous triple drain on your raw, mechanical, and human material. You will have to to continue to make vast quantities of munitions for yourselves, and the Allies. You will have to build vast freight fleets. You will have to feed and equip great armies. In respect of the last factor, never forget that the soldier eats more than the civilian, and that the army eating arrangements must necessarily be wasteful on account of field movements.

Let me say at once that I think you will find the strain first in transport. You will find the army requisitions an immense amount of rolling stock. There are some lines in this country whose rolling stock and lines are being used for army purposes practically six days out of seven. That gives the private business man one day on which to get in his raw material and to ship his finished products.

You will find the effect of this strain first in short, as distinct from long distances. For the last 20 months,

since manufactured materials began to be moved to the continent, we have had to adopt motor transport for all distances under 40 to 50 miles. I do not say that it is always cheaper to do so, especially for the retailer. *But the vital thing is to keep on meeting the demands of the customer as long as it is humanly possible.*

In houses where good will is partly dependent on delivery, the increased expense of a fleet of motor trucks must simply be faced with a view to preserving good will. And, at this point, I would advise American manufacturers and retailers who are making deliveries within a 50-mile radius to increase their stock of motor trucks right now, and on the spot.

HERE'S A HELPFUL ANALYSIS OF TRANSPORTATION DIFFICULTIES AND REMEDIES

The reasons for this are the three which follow:

1. You cannot depend on getting your shipments with the same uniform regularity as hitherto. One day there will be a rush of material into the works; on the next you may find your entire deliveries held up. Consequently more buffer room is wanted. Therefore, I advise you to invest in more trucks at once, and to buy ahead on all rolling stock.

2. It will become more difficult to get repairs made quickly, owing to many of your motor establishments being put on war work. Consequently you will need a service of trucks to keep your motor service going.

3. If you postpone the ordering of wagons you risk being held up on delivery, owing to either a shortage of raw materials, or of workers, or to government orders which will take precedence over yours.

The question of warehousing arises in connection with the transport problem. You have already had very great difficulties because freight has been so disorgan-

ized. But the difficulties ahead of you are even graver. For you will find yourself compelled to take delivery of material when you really don't want it, in order to avoid going short later on.

We have, at home, three means for overcoming this tremendous warehouse problem:

1. We have simply had to build sheds wherever possible, in order to house our enlarged stocks.
2. We have had to hire warehouses wherever we could get them.
3. We have had to utilize every yard of odd space about our factories for the storage of stock. The wise American manufacturer will get up some extra sheds now, while some timber and labor still are available.

The next point one has to study very carefully is the location of one's sources. In the early stages of the war, we never thought of the precise location of the nearest producing center. For instance, we were bringing raw material from India, China, Japan, and Australia—a four to six weeks' journey—when we could have got it in certain parts of West Africa, a three weeks' journey. I need hardly point out to you that if one ship traveling to and from West Africa carried 20,000 tons of material per year, it would only carry about half that amount if it was trading to and from Australia, or some equally distant point.

Thus we have been able to double the turnover obtained from some of our tonnage. In some cases we are getting three journeys in place of one. I need hardly say that this entails also a saving in man-power; an increase in the speed with which ships can be turned round in port; and a saving of space in the warehouses at the other end, through quicker export.

No less important is the question of interchange of raw materials. For instance, tallow, one of the raw

materials essential to soap, comes from Australia. But you can use as great or as small a quantity of tallow as you desire. You can substitute for a large percentage certain other materials which can be obtained from countries nearer home. As a result of our experience, I would advise any American manufacturer to make his chemists take up the study of substitutes for all raw materials coming from long distances.

One of the results of the loss of traffic facilities in this country has been a very scientific system for eliminating waste. In war time it is criminal for one line to be running trains light while another has its rolling stock overloaded. In this country it has been arranged for companies to pool their trucks and so to organize transport that no truck is ever run light instead of carrying a useful load. This has proved to be a great solution of some of our transport difficulties, and I think I may say that railway coordination between various companies has been very ably accomplished by the government.

I think that America is in the forefront of the manufacturing countries as regards using up waste in the factories. She makes a better and more scientific use of by-products and waste than any other nation in the world. This is bound to be so from the conditions existent in America. Machinery is expensive, wages are high, living is dear, consequently all these things have a high value, and receive due consideration.

But you will never get a highly paid people with the ability to earn high salaries to work on the same lines as the thrifty mountaineer whose wages are small and whose opportunities of making money are very limited. I have known what it means to draw one's livelihood from one little wholesale store. When that was my business, wages were low in this country. We would set by one day a week to collect ends of string and to cut squares out of waste paper, so that it could be

The British Health of Munition Workers Committee recommends the provision of rest rooms of some sort for all women workers. This rather elaborate rest room at the main plant of Lever Brothers has proved well worth while.

Here are some of the women workers Lord Leverhulme praises so highly. Surely these girls are adaptable: they are making wooden boxes for the Lever product.

This photograph was taken in England at one of the Lever Brothers' plants. The workers are replacing men who have left for the front and active duty.

used again. Labor is so expensive now that it would be a very positive loss to make these small economies.

Some economies of material are economies for the state as a whole, in that they consume less, but are not an economy for the business, so far as the cutting down of expenses is concerned. We, for instance, have made economies in the size and number of wrappings; and in the entire elimination of them for some lines of good; but this has been entirely neutralized by the increase in the prices of material we could get. In fact, this question of saving material tends to settle itself to a great extent without any voluntary effort on the part of the manufacturer, for if he cannot get materials he cannot use them.

With regard to the waste of labor, America need go to no nation in the world for a lesson. For, on account of your high rate of pay, you have greater output per human unit than any other nation. Anyone, therefore, who feels that America is unprepared for war, in this respect, is wrong and will be proved so.

SOME TESTED WAYS TO INCREASE WAR-TIME BUSINESS EFFECTIVENESS

But you will find that you are compelled to go even further in increasing the efficiency of the worker and in replacing men with machines, as the double demand for war materials and men for the services becomes more intense. Perhaps the most important labor saving innovation we have made since the war is the centralized calculating room, where all calculation from every part of the works are brought in to be dealt with. Here all the payrolls are made up on the machine labor-saving principle and a large battery of automatic calculators saves us endless clerical work. Typewriting, however, is decentralized, each department doing its own work of this, and of like types.

This brings us to the all-important subject of manpower. Here a multitude of problems is involved. The first is the sudden dislocation in a business caused by the initial rush of men to the colors. In the early days of the war, I went with 700 of our men in one block to Chester where they joined their regiment. The second is the possibility of a business being caught with short stocks and no workers to provide more immediately. Those early days, with us, when men were called out at a moment's notice, were very difficult, but they found us with ample stocks, so that the disorganization was not as disastrous as it would have been had we carried small stocks. A reservoir of stock is a shock absorber. I think America at this stage will find herself well protected, and will thus be able to meet any strain caused by men leaving for enlistment.

When a worker joins the army it is almost a necessity for the employer to arrange to make the wife's income equal to what she had before her husband was called up. She may have a mouth less to feed, but the husband may have done many little things in the house which more than made up for that. If an unmarried man is the support of his parents, we inquire into his case and if he is the only son we make up the allowance as a rule, though not to the same amount as in the case of the wife or dependent children.

When 5,000,000 men have left work for the army, substitutes become very difficult. But I should not recommend any employer to refrain from training delicate or elderly men as substitutes on account of their physical condition. People who are old by the calendar may do splendidly. Age reckoned by the calendar often is so very misleading!

Often, of course, you have, in war time, to promote the old man who always stuck in the mud. But elderly men who had missed promotion in the past have re-

sponded magnificently to the opportunity given to them now. A man may be first mate too long! When the captain goes, it gives him a chance to prove it.

In the early days of the war we were subject to the government rules with regard to the employment of women, and could not allow them to work later than 7 o'clock at night, or earlier than 7 o'clock in the morning. But later on the government gradually removed its restrictions, until today there are no restrictions. Women can work, by special permit, under exactly the same conditions regarding hours and overtime, as men, and they work them successfully.

There is only one word for the feats performed by women workers at Port Sunlight—magnificent! We have always employed great numbers of women on the lighter work. But today there are 1,392 women in Port Sunlight who are doing men's work—that is, work which we never anticipated that women would be able to tackle and perform successfully.

We were, for instance, one of the first firms to employ women chemists, and we find them quite as efficient as men on routine work.

Many British firms have since followed our example:

PERHAPS YOU'LL LAUGH AT THESE PLANS, BUT THEY HELPED

A large number of our women are dressed in men's clothes. They have to be, for they are doing dock work; they are rolling barrels about; they are loading vans; they are pushing trucks; they are carrying emptying cases in the melting houses; they are receiving and stacking timber. In heavy work we invariably find it necessary to employ three women to replace two men.

Before the war, out of every 100 people who were employed, 32 were women, and 68 were men. Today 51 are women and 49 men. Quite a difference!

We have discovered that the women, while they have no objection to wearing men's clothes, have a distinct objection to their ugliness. We have to make some difference in the cut. Women like to have a belt, we have to make the belt of a brighter color, usually red. And, of course, they insist on a bright collar to their coat of the same color. One has to admit that their judgment is generally superior in that respect to that of we men.

When we first put women on work entailing heavy lifting and bending, we found that it was inclined to hurt them. Our doctor discovered that it was not the work, but the corsets that the women wore which were at fault. Accordingly, we asked an expert to design a corset which would enable the women to stoop without strain of any sort. This was done, and we now supply our own corsets to the women on heavy work. These have been approved by the Home Office, and recommended by them to other firms. In a word, they have been a great success.

We have rest rooms all through the factories. If a girl feels faint she goes to the rest room. I must say, that whenever I go around the factories, I look into the rest rooms. And I have never found even one girl out of the thousands we employ (at Port Sunlight) in any one of them.

But war brings shortage of staff abroad as well as at home. Now in the Congo we have great difficulties with our white staff—difficulties because they are called up for military service and naturally desire to help their respective countries all they can, whether they are Belgian or whether they are British. But the natives during the last 12 months have shown a surprising facility in adapting themselves to work that they were never considered equal to before.

Typewriting, for instance, is a work that the Congo native has taken to, I may say, like a duck to water. We have had reports typed by Congo natives, under 20 years of age, who were the children of Bush savages. This work comprised reports in French with technical phrases and chemical symbols, accurately shown. I believe that the natives in the Congo are going to be like women in England, taking the opportunity of a scarcity of white men to occupy many new posts.

We have achieved increased output entirely through the loyalty and devotion of the staff. The men remaining behind and the women have considered it was "doing their bit" to keep the factory going with whatever men there were. Copartnership has helped in this. You cannot drive workers under war conditions, or any other conditions. If they will not respond to inspiration, to leading, it is hopeless. If the motive of helping their colleagues at the front will not inspire them, then nothing will.

During these last three and one-half years we English employers have had to re-think out the question of our relations with labor from A to Z. Frankly, in many cases labor has now the upper hand. Men are so scarce that they can afford to make their own terms. Public sympathy is rather with the employee than with the employer. Necessarily the governmental bias is also toward the worker.

But, in this country, at least, labor has been splendid. Almost in no case has it taken unfair advantage of its position. On the other hand, we have come to know what it means to have labor continually in our councils, to have labor magnificently represented by a very able minister and a ministry with enormous resources of facts and figures. I, like many others, look forward to the day when labor will be heard not only in trade conferences, but at private business board meetings.

When we are talking of labor we are talking of men and women, not of machines. Men and women are the finest work of the Creator. When you consider labor on these lines, the tendency for improvement is perfectly natural. And when this great war is over, a large voice in the rearrangement necessary should be given to labor. It will mean not only a share in the profits of labor, an increasing share, but an increasing voice in the self-government on democratic lines of labor in the factory.

THE *proper employment of the industrial forces of the state to assist the Government will tax the ability of employers. Not only are skilled workmen withdrawn from our industries, but workmen must be reeducated for the production of munitions and government supplies where plants are turned over for that purpose. This will make necessary a large shifting of workmen, and the enforced idleness of some industries will leave others out of employment. In two ways the problem is important:*

First. In the proper distribution of our efficient labor among our industries; selfish appropriation by any one industry or any one community cannot now be permitted.

Second. The proper protection of the unemployed must be more intelligently attended to."

J. G. HOFFMAN
Secretary of the Michigan Manufacturers' Association

CHAPTER III

WAR-TIME MANAGEMENT METHODS THAT HAVE WON SUCCESS

By G. E. HAVINDEN
Managing Director, The Watford Manufacturing Company, Ltd.

Here's a chapter that is especially likely to help business men—both in war and in peace times. Of course your business may not be large enough to allow the adoption of an elaborate committee system of management, but whether it be large or small, you, no doubt, can get some helpful ideas for gaining employees' cooperation from the pages that follow.

THE first object of any business should be to render a service. Whether it be manufacturing the product or selling it wholesale, exporting it overseas or retailing it across the counter; whether it be offering insurance protection or the occupancy of land or safe storage for money; always the first aim of the business must be to give service.

A business must make profit if it is to be worthy of the name; it is for that the holders have invested their money and have appointed the management. But the public is not interested in paying profit to the shareholders. It is interested in buying value. And the surest way in which the management can bring permanent and continuous profit is by making it the first purpose of the business organization to supply a service. Establishing the policy of service is, therefore, the first and a vital principle of management.

Now service includes many elements. Taking manufacturing as a concrete example, it means in the first place a worthy product. Making the product the very best you can, then, should be stated as the second principle of good management.

Next, this good product must be offered to the public at a fair price. That means that there must be efficient manufacturing as well as honest manufacturing. It means that production costs must be economical, that there should be no extravagance in buying, labor, administration or selling expenses. A fair price, based on economical production, must therefore be the third principle of management.

Then the goods must be got into hands of the consumer promptly and in good condition, by means convenient to him. This entails efficient merchandising plans—the fourth principle in the management of a business that wins success.

The majority of businesses must live by continuous purchases from the same individuals. That means that a feeling of good will must be created for the concern in trade circles as well as among consumers. Now, this necessitates more than a good product and prompt deliveries. It means also keeping the needs and demands, the peculiarities and caprices of the buyer in mind; as well as the convenience of the middle men of the trade; and this in turn means adjusting many little factors in the organization to these same demands rather than to the conveniences of the business itself.

So the fifth management principle is this one of conserving and developing good will.

But a business owes a duty to its staff as well as to the public. Fair wages, right working conditions, education in business principles and the company's policies and ideals, as well as training in technical processes, opportunity for the best use of the individual's talents,

mutual personal interest—are what the employee has a right to expect. A humanizing staff policy may be set down as the sixth principle.

These principles of management are coordinate as well as successive; that is, in starting a business or in reorganizing a concern these are the successive steps to be taken; while in a going business these six principles are constantly guiding the management in its operations.

How shall these principles of management be carried into operation? Through the right system of organization and proper administration.

A company consists of three classes of individuals:

1. The directors, not intimately connected with the details of the business.
2. The active managers, foremen and workers who are responsible for the conduct of the business.
3. The rank and file.

The second class again divides itself into three distinct groups:

a. The managing director, who is the head of the whole organization;
b. The department managers, who are part of the management but engaged not so much in planning policy as in carrying it out;
c. The foreman and charge hands, who are in immediate control of the detailed operations and of the workers who perform them, and who are agents for carrying on the management itself.

The personnel under these three headings falls into two groups: advisory or executive—men who advise and men who execute—men who study and plan, men who act and carry out; or to use military terminology

with which we have all become more or less familiar, staff and line.

Whether a manager realizes it or not, all members of his staff are one or the other of these. I believe it most essential that the management be conscious always of the classification into which each man falls. For rarely should or can both functions be expected from the same man; the two must employ entirely different means and aim at different ends; and therefore they require quite unlike abilities, points of view, habits of mind, and working methods.

HERE YOU GET SOME DEFINITE GUIDES FOR SELECTING EXECUTIVES

The excutive type of man, who belongs to the line organization, needs administrative ability, energy, purposefulness, quick decision, and prompt action. He needs to know how to get men to do things. And, most of all, he must get things done. He it is who is held up to schedule and must show definite results for definite periods of time.

The advisory man plans rather than carries out. He advises what should be done, not executes the operation. He studies and analyzes and experiments, and leaves it to the executive to apply. It is not his duty to get a thing done by a certain time nor to handle a large body of men nor to produce a certain volume of product or sales, but to plan in advance.

It is for this reason that the management must decide in every case whether, for instance, a certain well-informed man shall be made the manager of a producing department or shall be held responsible for research work connected with bringing the product to the highest pitch. An executive engineer for instance, is in charge of the machinery of a works, responsible for seeing that the power is there ready to be applied, and that the

power is produced at a certain cost; the consulting engineer is employed to study the problems of power generation and distribution and to advise improvements. The manager of the works is charged with getting the best product out of the machine equipment and the human personnel; but the chemist studies, experiments and makes tests in his laboratory for the purpose of finding ways of improving the product.

In the three classes—directors, active managers, and rank and file—the managers should be distinctly either advisory or executive, the directors should be made sufficiently familiar with the affairs to act as advisory, and the rank and file fall under the executive class.

The managing director stands aloof from both. He really impersonates the management and draws around himself men of both classes, those who can advise and those who can execute. He is the centering point of the entire organization, and his problem is to draw the directors down to take an interest in the detail of the business, and to pull the rank and file up to take a general interest in the business.

Generally the directors are merely watchdogs of the treasury, knowing too little about the technique of the business and not interested in its personnel, making their decisions therefore from a standpoint too aloof. Such directors are not best for the business. They do not contribute anything to the progress of the business, but are more likely to handicap it and to prevent the executive from carrying out the best principles of management, and thus to cut returns.

The rank and file, on the other hand, are usually too much interested each in his own little pinpoint of detail or in his own personal relation to merely that bit of work. It is for the management to see that the individual worker realizes his proper relationship to the whole business, the bearing of his particular job on the collective

operations, and his importance as an integral part of the organization. That necessitates arousing his interest in the business as a whole and in its general policies. It is only when every worker understands the key policies of a business, that business can render the best service and secure the best results.

The policy functions of the manging director can be analyzed by saying that the main end to be achieved is to—

produce	by	*premises*
permanent	the	*plant*
profitable	aid	*product*
pleased	of	*personal*
patrons		*publicity*

His first duty is to plan the theory of the business in its true perspective. He deals in principles, not detail. No managing director can hardly know too much about the details of his business, but he can do too much of the details. There is a vast difference between knowing what is going on and doing oneself too much of that which is going on. He should see to it that the principles of management are effectually incorporated in the policy and methods of the business, and that they are observed and followed in its working. So that while he deals in principles and not details he must see to it that the details conform to the needs of the principles. He needs intimate knowledge of details to enable him to note any not in conformity with the principle, to be in position to set right such as go wrong, and to give him the power to analyze every phase of his business in order to arrive at its own particular significance and thus to judge it in its relationship to the whole scheme of the organization and his present policy and future plans.

Far too much emphasis has been placed in business on technical knowledge; familiarity with details of processes

has been put to the fore. Yet technical knowledge is much more plentiful and easier to secure than knowledge of management principles, and an expert knowledge of the particular processes or an industry is widely diffused among the staff of any works; but these qualities are really far less essential in a manager than executive ability, the faculty of leading men, judgment, and foresight. It is the latter characteristics that proprietors and directors should seek in a manager rather than those expressed by the old formulae, "experience in our particular business—knowledge of our peculiar processes."

And, most important of all, as the active executive head of the business he must carefully distinguish between leading and driving, between managing and merely giving orders, between organizing staff and making automatons of them.

WHAT ARE THE RESULTS OF A MANAGEMENT POLICY LIKE THIS?

The managing director equipped with such a point of view will not impose his policies upon his staff, but it will be his privilege to receive the support of his staff in carrying out the policy that has been agreed upon. By the perfect performance, then, of each person in the organization of his allotted task, combined with a willingness and interest based on agreement with the policy, the managing director will be sustained and held in his position by the support which he receives from those below him in rank.

This brings me to what I believe is one of the most significant principles to be grasped by the managing directors: that the keynote of his ideals of organization should be support by the staff rather than control of the staff through iron discipline alone.

A pyramid concretely illustrates the idea: the principal officer is at the apex, the rank and file at the base,

with the intermediary planes of authority between. Without the departmental managers below him, the managing director would have no support; and likewise without the foremen below the departmental managers to hold them up, they would fall. The foremen in turn are supported by the charge hands and cannot "carry on" without that support; the latter again are supported by the rank and file.

According to this point of view the director is held in his position not by measure of what he can get out of his managers, but by measure of the support they give him. Likewise the charge hand is not held in his submanagerial post by the amount of driving and grinding he can exercise over his subordinates, but by the support he wins from them in carrying out the instructions he receives.

This point of view eliminates the drive from business and substitutes cooperation for it. It replaces the man who climbs over others by the man who is lifted up by others. It introduces the human cooperative element as opposed to the bitter competitive element.

Now the committee system may be applied either generally throughout the business or at only one or two points of extra responsibility. I believe it should be applied at every point in the business so that the committee idea will form an integral part of the organization of the company. Before I describe concretely the workings of one such committee system it may be well to lay down certain elementary principles of governing by committee.

1. Care should be taken: (a) that every worker is represented somewhere among the committees; (b) that overlapping is avoided among the committees themselves.

2. The duties of committees should, like the functions of the staff, be divided into (a) advisory (b) execu-

tive or administrative. It is far better that some committees should be purely advisory and some purely administrative, than to expect both classes of duties to be carried out by the same committee.

3. The committee system should not be introduced until a whole-hearted enthusiasm for it and for the general idea of spreading staff responsibility has been aroused in every member. The system should therefore not be installed until the whole idea as it affects the policy of the house has been fully explained to the entire staff: (a) to the leaders in conference in complete detail with a full discussion of the conditions to be secured and the methods to be followed; (b) to the rank and file with their leaders present.

4. In using the committee system this principle in the management of employees must be observed as a safeguard: (a) any number of employees or workmen may be responsible to one person, (b) but no worker should be responsible to more than one person.

5. And, finally, a step which I have found most important, although not so much from the point of view of principles as of method, is that minutes of all committees must be kept and read back at future meetings so that nothing may be overlooked.

In installing the committee system the first step is the determination of what committees shall be formed; the second, what persons shall be appointed to the committees; the third, the routine by which the meetings are actually to be carried on and how the decisions arrived at shall be put into execution.

To illustrate my point I will describe the actual committee system of a food manufacturing business. The committees number 11, as follows:

1. The "apex" committee is the board of directors, which is the source of all authority, which periodically

reviews the work of the entire business, has direct control of finances, and approves general policies. This board meets weekly.

2. The most authoritative of the actual committees is the board of management. This consists of the managing director, the general manager who has charge of the works and offices, the secretary, and the sales manager. This committee meets weekly and reviews the work of all the other committees. At this meeting are read the minutes of the meetings of all the other committees which meet together weekly, and a synopsis of the week's minutes of the committee which meets daily. It is really the keystone committee, which plans and finally controls the operations of the business, approves or disapproves of decisions made, and indicates policies.

3. The general works committee is perhaps the most important of all from the point of view of the volume of its activities. It meets daily and consists of the general manager, the sales manager, the buyer, the engineer, the heads of the various manufacturing departments, the heads of the stores and transport department and the cost department; together with certain managers who serve this committee in an advisory capacity, such as the head of the research department and the head of the welfare department—these attend regularly one meeting in the week and can be called into any meeting.

THE TIME AT WHICH COMMITTEE MEETINGS ARE HELD IS IMPORTANT

This committee meets at noon each day. It happens that the lunch hour for the factory workers is 12 to 1, the lunch hour for the office and the departmental heads is 1 to 2. Consequently when the whistle blows at noon for the workers' midday meal, it is also a call to the general works committee meeting. The meeting is usu-

ally over by 1 and the members can then lunch in the works dining room and are back at their desks at 2. The advantages of holding the meeting at this hour are fourfold:

a. The work of the day has been started; the morning post has been dealt with; the supplies that come in by railway have been received.
b. The day's work is in full swing.
c. The day's problems, obstacles and needs have come up to the various departmental heads and are ready to be presented to the committee.
d. The decisions of the committee can be executed or acted upon immediately, the same day that they are made.

From all points of view, therefore, a meeting at midday is better than a meeting the first thing in the morning or the last thing in the afternoon.

Each member of the committee carries a diary in which he has made a note of points he wishes to bring up and in which he has entries from previous days of other affairs to be dealt with. The general manager presides at the meeting and first reads each day the minutes of whatever departmental weekly committee meeting has been held the day before. This procedure has the twofold benefit of keeping the general works committee in touch with what other committees are doing, and also to bring before this general committee any matters taken up in the subcommittees that need prompt attention.

The chairman next takes up any affairs that he has to present, and then gives each member in turn an opportunity to present his problems. Whatever questions arise are fully discussed from all points of view, decision

is taken, the method of carrying it out authorized, and the requisite notes made in the diary of whatever member has anything to do with the question.

The general works committee holds an extra weekly meeting at 4:30 on one afternoon, in which the minutes of all the daily meetings are reviewed and question of policy calling for immediate discussion are threshed out to a conclusion. These meetings as a rule extend well into the evening.

4. The minor committees divide themselves into two groups: those that have to do with the particular functions of the business and those that have to do with the various departments of the business. In the first class are the following:

a. The buying committee, which consists of one of the directors, the buyer, and the assistant buyer. This is purely an advisory committee; the buyer still has the final authority to make purchases and to make such decisions as he thinks fit. He reports what he has done to the buying committee, he can get their advice, and he can ask for the cooperation of any other member of the staff.

b. The publicity committee, which consists of a director, the sales manager and the chief clerk of the export department.

c. The publicity committee, which consists of a director, the sales manager and the chief clerk of the advertising staff.

d. The sales promotion committee, which consists of the sales manager; the art director, who has charge of everything pertaining to printing or business publicity, not only the advertisements and booklets, but also labels, show

cards, printed forms, and so on; and the chief advertising clerk.

e. The welfare committee, which consists of the secretary, the lady superintendent, the head of the research department, a doctor who attends one day a week at the works, and forewomen who are the heads of various subdepartments in the works and office.

5. The second group of committees consists of one representing each of the operating departments of the works. The general manager is a member of each of these committees. The manager of the department is the chairman of his committee and other members include various foremen and forewomen.

WHY BOTH RANK AND FILE AND MANAGEMENT MAKE UP THE COMMITTEES

The weekly meetings of these committees follow much the same routine as the general works committee. Each member has a diary and brings into the meeting any questions he wants decided, any suggestions he has to report from his department or from the workers under his charge. The minutes of the preceding meeting are read and no problem is allowed to be lost sight of without being settled. These meetings are usually held at 4.30 on different days of the week; as the works close at 5.30, this simply consumes the last hour of the afternoon which is perhaps to be considered the least valuable of the day. Besides, if the meeting extends beyond an hour no work is being interfered with after that time; the committee is, therefore, always free to sit as long as is required to complete its work.

One fact has to be noted in the make-up of the committees. An attempt has been made to carry out the management principle of bringing the directors from

above and the rank and file from below into contact with the policies of the business by including a member of the board of directors in each one of the functional department committees, and by bringing some of the subforemen into the works departmental committees. A further step might perhaps well be taken by including in all the committees one or two members of the rank and file elected by the workers themselves; this would bring the workers even more closely into contact with the management of the business and give them a greater personal interest in the company.

The benefits of the committee system are many:

Improved planning. More foresight is exercised by a committee than by an individual. A committee of six departmental heads can exercise just six times the foresight that one man can, who has only one sixth of the insight into the business that the committee has. It is difficult, for instance, for a production department to be familiar with the future needs of the sales department, unless its head is in daily touch with the plans of that department. Likewise a buyer can carry out a much more effective purchasing policy if he knows probable requirements based on the plans of other departments.

The quality of the product is improved. For when the works and the sales and the stores departments understand each other's problems and needs, more uniformity and standardization result.

Production cost is lower, through standardization, through better planning, and through more efficient production, and through the increased turnover that will result from the sales department placing emphasis on the goods which it knows the works are best fitted to produce.

Better service results. Again, from knowing the plans of the sales department the works can look farther ahead and be in a position to supply the goods that the market requires.

Sales are actually increased; first through better service and the lowering of production cost; also department has more accurate cost information and through knowing what best to sell because the sales therefore greater facilities in quoting.

Finally, there is the advertising value of the committee system; not only the direct advertising among customers, resulting from better service and better quality goods; but also the indirect effect that more efficient organization and closer cooperation and greater knowledge, which the committee system brings, has on the good will of the company.

There are some disadvantageous tendencies in the committee system which to know, however, is largely to overcome. The committee system may have a tendency to decentralize authority. This must be guarded against by making it clear to all the staff that the heads of departments are still executive and responsible heads, that decisions must be made by them, and that their individual decisions are final.

There is also a tendency under the committee system for managers to shift, consciously or unconsciously, their responsibility to the shoulders of the committee. This again must be guarded against by making it plain to all that most of the committees are purely advisory, that the managers are to use them to get advice, but that the final responsibility for each department is upon its manager. As far as the executive departments of the administration itself are concerned here again the departmental manager must be repeatedly warned that the committee is simply for his convenience in better carrying on of his

work and for passing on to him decisions of policy; but the responsibility for the conduct of his department and for the execution of these policies still is his.

Committee meetings may lead to waste of time. Against this the features described above will operate; a fixed and convenient hour for meeting, a strong chairman, adherence to the diary system, definite decisions made and rigidly followed up until they are carried out.

These principles of management and this system of organization may be crystallized into the term "organized relegation": the distribution of authority and responsibility and interest among as many individuals as possible with the object of strengthening the staff, and so increasing its powers of supporting the management in its declared policies.

YOU have asked me to say a word as to your duty as business men. Let me change that word from duty to opportunity. If any American, business man, farmer or official, wishes to know his duty, let him ask one of our soldier boys. Let him carry before his eye that stalwart figure in khaki, this square-jawed hero of a new crusade. An appeal to him will answer all doubts as to what any of us should do. We have come upon a new day and a new philosophy. We are to judge men henceforward, not by what they have, but by what they give.

FRANKLIN K. LANE
Secretary of the Interior

CHAPTER IV

HOW AMERICA CAN MEET WAR-TIME BUSINESS CONDITIONS

By SIR CHARLES W. MACARA, BART.

Sir Charles Macara's advice to American business men in this chapter is worthy of deepest consideration. He is one of the foremost handlers of men in England—handler in the sense of embuing them with the spirit that rises to meet the gravest of emergencies. Perhaps it would not be too much to say that he has been as responsible as almost any man in helping England to place her forces—both industrial and military—on a plane successfully to meet the forces of autocracy.

In English society and in English industry the name of Sir Charles Macara stands for more than an individual; it stands for a spirit, and, indeed, for a force. For more than 20 years Sir Charles was president of the Federation of Master Cotton Spinners' Associations; and during that long period he was the official head of the British cotton trade.

Not only did he place before the government the plan for taking the National Register—the first essential step in the mobilization of England—but he assisted in launching the scheme.

MY advice to America is—rather use the organizations existing in the framework of peace, than attempt to create entirely new ones. One of the bodies we should have used for this purpose here was the Industrial Council. It consisted of the trusted leaders of capital and labor; it was already a working mechanism, and capable, therefore, of dealing powerfully and promptly with the great questions of employment that arise with the waging of a war, and must be settled promptly.

In the same way I suggested that the municipalities should take and tabulate the National Register, and the speed, precision and economy with which that work was done proved the soundness of the plan. By giving definite instructions to our 2,000 municipalities, it was just as easy to organize the whole country as to organize one city.

In every highly developed civilization, almost every great interest will be found to be already organized. Labor, capital, finance, transportation, science, each of these organizations should be put on a war footing and kept there for its special war work. When this has been done, all of them can be knit into one strong and sensitive entity, and the whole nation will thus be efficiently at war. To employ the tried brain, and the well-oiled wheels, is my advice to America at this stage of the conflict.

The war has definitely proved the commercial and industrial adaptability of women. But they would have done much more here if there had been proper organization when the great migration of women into commerce and industry began. The rush was not anticipated nor directed. Women were allowed to drift into occupations largely as they liked, a state of things not at all necessary, seeing that in the National Register the country had an inventory of all its woman resources.

It is on the necessity for national organization that I insist first and last—not organization for the sake of organization, but for the sake of work. Accordingly, I earnestly counsel you, at the end, as at this time, to make full use of the means which your country has ready for use, and nearest to hand. My experience has always been that in great movements the best work is done with the aid of a small but efficient staff. Definite instructions should be given, and thus simultaneous action is insured. The local governing authorities, the

associations of capital and labor—these are in working order, and can quickly get up the steam pressure requisite for successfully waging war.

The great staple industries can only be dealt with by the organizations of capital and labor, although minor industries might be dealt with by the municipalities. It is only those who have had to deal with strikes and lockouts in great industries who can understand how to deal with these industries in emergencies. I have never tired of telling England that ordering of industry is a part of the vital strategy of war. In other words, I would plead with your government to let its business men organize the nation's industries on a national scale. And I would plead with business men, at the same time, to offer their great services freely to the state right now, and not wait until heavy losses have been incurred through inefficient organization. The business men can carry the nation to undreamed-of triumphs; but they must take the reins now and keep them.

TO the men who run the railways of the country, whether they be managers or operative employes, let me say that the railways are the arteries of the nation's life and that upon them rests the immense responsibility of seeing to it that those arteries suffer no obstruction of any kind, no inefficiency or slackened power.

WOODROW WILSON

CHAPTER V

HOW ENGLAND IS MEETING THE LABOR PROBLEM

By the Rt. Hon. John Hodge, M. P.
Minister of Labor

You'll all agree, no doubt, that some phase of the labor problem is always up, or about to "bob" up, for consideration at all times—either in peace or in war. The coordination of the efforts of labor and our military effort is, of course, vitally necessary to winning this war, and that's why this chapter—in which the Rt. Hon. John Hodge, England's first Minister for Labor, tells how England has brought about, and is maintaining, this vital coordination—is particularly interesting and helpful to every business man.

Mr. Hodge is a business man, pure and simple. A Scotsman, of the working classes, he began life as a steel smelter. He formed the British Steel Smelter, Metal, Iron and Tinplate Workers' Association, was its first secretary, and has occupied that position ever since. He has held a number of posts in the Labor Party. Since 1906 he has represented Gorton, which is virtually a part of Manchester, in the labor interest. Before his appointment to the Ministry of Labor, in December, 1916, Mr. Hodge was the acting chairman of the Parliamentary Labor Party in British national life. Since the outbreak of the war he has played a highly patriotic part.

As soon as it was realized that the war was going to be a war of material, and that this country was short of guns and shells, the Government decided to create a new department called the Ministry of Munitions, of which Mr. Lloyd George, on account of his inspiring personality and organizing ability, was selected to take charge.

The first thing that he did was to convene a conference of all the leading trade union officials in the country.

At that conference he took the delegates into his confidence and explained to them very fully many things which could not possibly be published to the world at large. He put forward the proposal that, the crisis being so grave, trade unionists should give up some of the customs, privileges and conditions of employment which they had been fighting to obtain for the past hundred years. On behalf of the Government he undertook that when peace was declared everything should be restored to its old footing.

The delegates agreed almost unanimously to the suggestions made by Mr. Lloyd George, and those who voted against them did so because they could not commit themselves without consulting their management committees. When the delegates reported to their respective organizations, I do not know of a single instance in which the proposal was rejected.

It may be well to name the concessions made by labor:

1. They permitted what is commonly known as dilution of labor. A fitter or engineer now simply acts as supervisor; keeping the tools in good condition and teaching unskilled and semiskilled men how to operate the machines
2. They annulled all restrictions respecting overtime, and
3. Restrictions on working machinery to its utmost capacity, and other similar practices
4. They agreed to work on Sundays when necessary
5. They gave up all holidays as desired
6. They admitted women to a great many occupations in which their presence had hitherto been objected to by both workmen and employers.

Inevitably the development of shell and gun output, the great new program for the building of warships, aeroplanes, and merchant vessels, and recruiting for the

new armies brought about a great shortage of labor. It was foreseen that a natural consequence of this would be great competition amongst employers for all available skilled workmen, and consequently inflated wage rates and shifting about of labor.

In order to prevent an uneconomic transference of labor as a result of the inducement of inflated rates of wages, consequent on a shortage of labor, it was decided that no man should be enabled to leave one employer and go to another without a leaving certificate from the first employer. If that was refused, the workman was given the right to appeal to a tribunal, which would decide whether his claim was legitimate or not.

If the services of a workman employed at any given establishment could be utilized to greater advantage at another, the Munitions Department reserves the right to transfer him without the consent of his employer.

There was no difficulty in getting labor to agree to these conditions, because of the great enthusiasm for the war, and no propaganda meetings were necessary.

ONE GREAT DIFFICULTY WITH LABOR UNIONS THAT WAS OVERCOME

The great difficulty was to persuade some of the trades to open their doors to women. The objection of the workmen to the emplyment of women was that employers as a whole never employ a woman unless they can get her at lower wages than a man. The workmen naturally said, "If we permit women to come in under these conditions what will happen to us after the war? Women will be kept because they are cheap and men will not be wanted, and we will lose out."

The result was an agreement between the Government and the trade unions, that if women were admitted to these trades, they should receive the same piecework rates as men, and if paid by time rates, adult women workers

These ships lie in the harbor of Antwerp. They were damaged or sunk by the Allies, but the Germans repaired them and are holding them in readiness to assist in their world-trade plans.

Germany has been building ocean tonnage despite the war in preparation for the world-trade contest to follow the restoration of peace. Above, for example, is a huge liner—the new "Bismarck."

woman feels faint, the lady supervisor sends her to a rest room, where she is looked after by a trained nurse, who decides whether she will be fit for work in an hour or two, or whether she should go home for the remainder of the day. This applies to all the 6,000 controlled establishments where women are employed.

As many of the girls employed came from long distances, and in a number of cases it was not possible for them to obtain food near the factories, lunch rooms were erected in almost every one of the factories or workshops. The lady supervisor looks after the food and sees that it is up to the standard. This general welfare work was such a success among women that the authorities decided it could not be bad for boys. So in a great many establishments boys are now being looked after in the same way and by the same system.

WHY DEEP CONSIDERATION WAS GIVEN THE FEEDING OF WORKERS

In the matter of feeding, very often the same problem confronted both men and women workers. Thousands of men were brought together from all over the country and factories were developed for the making of munitions beyond all imagination. It was necessary to feed these men in order to get good results. And where men are well fed, there is much less tendency to drink. The Government therefore urged upon all establishments where there were no proper feeding arrangements the necessity for opening lunch rooms. Of course, there was a good deal of prejudice to overcome, but this the Government met by paying a proportion of the cost of the erection of lunch rooms, dealing with each case on its merits in deciding this proportion.

After the war, the lunchroom system will stay, because employers have come to realize, as they did long ago in America, that it is profitable. Instead of having a dry

meal with a can of cold tea, the workman goes to the lunch room and gets a regular hot meal, and his output and general efficiency are improved in consequence.

During the first 12 months of the war we had no difficulty in getting labor to keep up the long hours, continual overtime, and absence of holidays. In fact, I may say that it is only during the last six or eight months that any trouble has arisen, from a variety of reasons, chief among which are the increased cost of living, wages not keeping pace with this, sometimes delays in dealing with differences, the long hours, monotonous toil over so long a period, no holidays. These all contribute to a feeling of irritation which magnifies little things to big proportions.

The Labor Ministry was formed by Mr. Lloyd George to meet these deficiencies when he reconstituted the Cabinet in December 1916. Our function is to act as intermediaries between the Government and labor, between the employer and employee upon occasion, and particularly between the Ministry of Munitions and labor. It is our business to make the vast industrial machine run smoothly, insofar as the better understanding of and consideration for labor can aid in this direction.

When I came in here I found that delay was one of the dangers at the root of such labor troubles as we have had. These delays will now be a thing of the past, so far as this department is concerned.

The Munitions Act provides that if any labor dispute lasts longer than 21 days without reaching a settlement, it must go before an arbitration board. But a great source of trouble has been the slowness of the arbitral machine. It has failed to see that delays cause irritation and are very dangerous. As a matter of fact, the whole of the recent trouble in Newcastle, when the engineering trade demanded an increase in wages, was due to the

fact that the proceedings were most unduly protracted and took nearly five months to decide.

Steps have now been taken to prevent that sort of occurrence—that is where the Ministry of Labor comes in. Ever since I came in here I have been working to get the machine expedited. One of the first things I did was to substitute national settlements for the local decisions. For instance, on the last year there was a general advance of five shillings a week in wages in the shipbuilding and engineering trades that operated over the whole of the United Kingdom. This disposes of the whole trade at one swoop, instead of leaving perhaps a hundred different claims to be dealt with from time to time as they come up.

Another means of speeding up has been the formation of tribunals of three composed of a neutral chairman, a representative workman, and a representative employer. The workman is not necessarily a trade union official: he may be taken from the rank and file. The advantage of having a workman and an employer on the tribunal is that they have a technical knowledge of the trade and are able to give an intelligent decision. You will understand that if the subject under discussion turns on some technical point a tribunal of laymen will frequently fail fully to grasp it.

Before becoming Minister, when the Ministry of Munitions wished to get the employees of some particular factory to work on Saturday afternoon, or on Sunday, I wrote to them and said, "Your firm is very anxious to work through next week end, because somebody is wanting steel for some particular purpose, (and I stated the purpose)." Then I followed by saying, "I know that it is quite unnecessary to advise you to do this; you all have sons and brothers and pals in the trenches, and every extra shell and extra gun may be the means of saving some of their lives."

It is not necessary to make a demand. You get the answer back: "Of course we'll do it." And it gets done.

In the steel and iron trades there will be no trouble or disturbance of any kind after the war, because we have made good in every respect and the employees fully appreciate it.

In this country the war has leveled class distinctions to a very great extent. As an example, early last year I was the principal guest of the Associated Chambers of Commerce. In speaking to them the first thing I said was that the age of miracles was not yet past. Before the war they would as soon have thought of inviting the Archangel Gabriel to be their principal guest as of inviting a labor member to speak.

SOME PROBLEMS THE WAR-TIME INCREASE IN INDUSTRIAL WORKERS BROUGHT

Where a new industry springs up rapidly in any country, there is always the danger that large bodies of men may have to be handled by inexperienced managers who will cause trouble simply through their lack of knowledge of human nature in the mass. In this country we have overcome this difficulty by developing our existing establishments. The only new concerns that we have instituted are filling factories, although, of course, the Government have erected a number of national shell-making establishments. In these cases the managers appointed were men who had been with existing firms and who were accustomed to handling large bodies of men. The danger of putting men who were not masters of the art of handling men in control of new factories was realized.

I was on the board of directors of one of these national factories. All of the board were selected as practical men, and at the beginning we met two or three times a week and went round the works with the manager after

each meeting. If a man could not come to a satisfactory arrangement on any matter with the manager, he was always referred to us. From the very beginning there was not a single labor trouble beyond the usual administrative difficulties. Of course there were occasional disputes between the managers and individual gangs of men or gangs of women working with a skilled man, as to what rates should be paid. But in every instance we were able to settle the matter satisfactorily.

The directors being in such close touch with the factory, everything went very smoothly. When we started we had plants for making 500 shells a week; at the end of a month we were making 800 instead of 500, and this ratio of actual output to alleged plant capacity has always been kept up.

Where you have peace and contentment among the workers, output goes up. In the course of time the factory of which I am speaking developed until it was turning out 15,000 shells per week with a plant that was designed to turn out 10,000.

Of course, many trades have been very hard hit by the restriction which the Government has been obliged to put upon exports. In the tin-plate trade, for instance, exports to Holland, Denmark, Norway and Sweden had to be prohibited, unless a license had been obtained, because the tin plate was finding its way to Germany. But, at the same time, there was a tremendous demand for steel. So everything possible was done to enlarge plants and to expedite production in the steel and iron trades.

Therefore, with the officials of the Steel Workers' Union, I helped to mobilize the idle tin-platers for employment in steel works. In addition to that, some of them were drafted to armament factories which were enlarging their shell-forging departments, and, consequently, required skilled men to take charge of the heating of steel. In this way we found occupation for about

1,200 of these men, with great benefit to shell production; for, being skilled workers, they caused fewer breakages and less waste.

Other trades have helped in transferring men from place to place to suit national necessity in the same way.

At this time (autumn of 1916) it was pointed out to the Ministry of Munitions that, when a man is transferred from one district to another he cannot afford to keep two homes on his ordinary pay. Such men were, therefore, made war volunteers, signing an undertaking to go wherever they were asked. For this they were paid either the rate of wages they received at home, or the rate prevalent in the district to which they were sent; always receiving the higher rate. In addition to this a sustenance allowance of $4.20 a week was made to each married man, and to each unmarried man who was the only son of a widow. The single man with no dependents received no allowance, as it made no difference to him whether he was in lodgings in Scotland or in Wales or across the channel.

WHAT ABOUT LABOR IN THE DAYS AFTER THE WAR?

One hears a great deal of loose talk about the return of trade union customs and privileges after the war. But labor cannot have it both ways. As I have said to men frequently: "You cannot maintain your high wage and, at the same time, go back to your old restrictive customs. If going back means returning to pre-war conditions it means going back to pre-war wages. It is impossible to go back to pre-war conditions because the cost of living will be high for some time after the war, and higher wages will be required to cope with it." But there will be no difficulties if the employers will play the game fairly and squarely.

In this country, employers have never been so alive to the value of unrestricted output as in America. The up-to-date American employer never thinks of cutting a piece rate once it is fixed. Here, immediately the employer thinks his men are making too much money, piece rates are cut. Therefore the men practice restriction in order to evade rate cutting. The employer has got to stop that and keep it stopped.

We realize now that capital must work *with* labor and labor *with* capital. There will be no room for strife between these two complementary forces, if we are to succeed in the industrial campaign of tomorrow. And in order to get labor's cordial cooperation, the lessons of this Ministry have to be taken to heart by employers.

THE most important fiscal problem in the United States today is that of financing private business without competing with government monetary requirements. Bankers throughout the country are just beginning to understand how difficult is the performance of this difficult task.

Fortunately, the machinery for relieving much of the pressure exists in our strong, centralized banking system and its great credit resources. But of even higher value will be the mental resources of our financial leaders. Our fiscal acumen will be put to its severest test. And upon the result of that test depends, in a larger measure than is generally realized, the financial future not only of the United States but also of the world.

CHARLES H. SABIN
President, Guaranty Trust Company of New York

CHAPTER VI

THE PROBLEM OF MAN-POWER IN WAR TIME

By COLONEL SIR CHARLES CHEERS WAKEFIELD, BART.

Colonel Sir Charles Cheers Wakefield, Bart., is a typical example of the business man who makes good in a remarkably short time. He is head of the firm of C. C. Wakefield and Company, the largest lubricating oil manufacturers in Great Britain. His company does most of the railway business in England, covering 42 British railways, not to mention the French state railways, the Egyptian state railways, the Indian state railways, and all the chief South American railways. He was Lord Mayor of London during 1916. His advice is both helpful and timely.

GREAT BRITAIN at the commencement of the war and for a long time afterward was entirely unprepared, both from a military and from an economic standpoint, for the titanic struggle. She had to learn as she went along, how to enlist and train her new gigantic army, and at the same time to keep six thousand great factories running on munitions work, under skilled direction.

At this historical juncture, the old but none the less true axiom, "experience is the best teacher," is peculiarly applicable. The United States is in a position to benefit not only from our experiences but from our shortcomings all along the line.

Both as a civic officer and as a business man, the problem that has most strongly impressed itself on me is that of man-power. It may be frankly admitted that in this

country, as in many other of the belligerent nations, we made grave mistakes at the outset. We, for instance, put men into the army who should have been on munitions work; we took men from the land who should have remained at the plow; and we put in substitutes in munitions works who should have been in the army.

I strongly support the action of the United States Government in making a register of all their available man-power at the very outset of hostilities; in subdividing these into sections, according as these men are (a) of such physical fitness as to be specially adapted for the army; (b) possessed of such engineering skill as is essential in munitions work; (c) possessed of special skill in farming. In this way you will be able to distribute your men among the three vital functions of war—fighting, munitions making, and food supply. I most earnestly hope that you will profit by the errors made by us in Europe, and you have started right by a scientific distribution of the man-power of your great nation.

At the same time, you must impose certain checks on the public by legislation, so that it will not rush in and purchase unnecessarily large stocks of material or food-stuffs as to create a false demand and thus raise prices to an undue degree. Steady buying, increasing just in proportion as production increases, must be the order of the day.

THE *primary concern of business in this country in 1918 must be the winning of the war.*

Modern warfare is largely a matter of production, and it is the task of business to produce and distribute the necessities of everyday life for our people, the supplies and war material which will be used by our fighting men, and in addition some part of what our associates require.

EDWARD H. CADY
President, The Guardian Trust and Savings Bank, Toledo

CHAPTER VII

RUNNING A STORE IN WAR TIME

By THE LATE SIR RICHARD BURBIDGE, BART.

Sir Richard Burbidge, Bart., was managing director of Harrods, important among the leading department stores of Europe, at the time this chapter was written. He died early in 1918. The chapter tells the distributors of America just how to meet the difficulties that arise under war-time conditions. Sir Richard Burbidge was made a baronet by His Majesty King George several years ago on account of business services rendered to His Majesty's government. He was one of the chief business advisers on the Garrison and Regimental Board dealing with the organization of canteens for the army; chairman of the committee on the organization of the Royal Aircraft Factory; and gave valuable assistance on the committees dealing with food control and national service. The general methods by which Harrods met the war should prove of interest to every American business man, no matter what the type or size of his business, for the principles underlying them are fundamental.

THE day on which war broke out between this country and Germany was a bank holiday. I and most of the department heads were out of town. As soon as the news came through, however, I summoned all of the buyers to a special conference at our establishment for that night, and went up from the Isle of Wight to attend it personally.

Before the war one imagined that one must have a certain amount of staff. It seemed necessary to have a man for this and a man for that. But when you find without them. We now employ 3,000 less men than before the war, most of whom have been replaced by women. Yet our sales this year were the largest in

the history of the firm. This result has been brought about by the fact that when the work has to be done somehow, the individual employee does more. At the same time, the public has been taught to reduce the amount of service necessary.

YOU WOULD HARDLY EXPECT THESE BUSINESS CONDITIONS TO COME WITH WAR

On the whole, our experience shows that the actual effects of war on the business of a department store are almost diametrically opposed to those which any manager might anticipate. One imagines, for instance, that there will be a tremendous shock to credit when war is a foil. In point of fact, owing to the nervousness of the public, everybody deposited his money in the banks, consequently the banks' gold reserves rose instead of falling. Then the government stepped in, and did not permit the Stock Exchange to close. By cooperation with the banks it was able to save anything approaching even a mild panic.

Next, one might suppose that people would try to run up bills rather than to pay cash, so that they could hold their money in banks or in safe securities. But as a matter of fact, *our cash sales have gone up 20%*. A customer who was ordering, say, $50 or $60 worth of goods a week on account, now comes and buys her own goods, and pays cash for them.

Among the upper classes, incomes have been reduced, and therefore husbands have warned their wives not to run up bills as formerly. Among the middle classes, in many cases, the earning power of the family has increased, and consequently there is a tendency to buy liberally and to pay promptly and pay in full.

More surprising still, we have fewer bad debts than ever before. The professional classes have had their in-

comes seriously reduced in many instances. And as a result they pay cash instead of running accounts, in order to get any possible discount. This is a much sounder position for the public in general. For I have always thought it unwise for relatively poor people to run up accounts with stores, which might harass them in the future. The war has taught the man with the small income to keep his wife's expenditures within bounds in a way that was never feasible before. Indeed, we now send out a series of only four collection letters, where before we sent out a series of six.

As soon as the war was well under way, we saw that our problem was to cut down overhead if we were to conserve profits. Standing charges are the only point at which you can effect a saving, when the wages of labor are rising steadily, when the price of stock is going up by leaps and bounds, and when transportation and other public service continues to cost you more year by year.

THESE BUSINESS PROBLEMS AROSE AS THE WAR GOT UNDER WAY

I can only say that we had no conception of how effectively we might wring profits out of our business before the war began. The new conditions have made us re-think out the whole problem of retail distribution from A to Z. Let me just point out what standing charges mean in a London store. Before the war we spent $750 a day on paper, string, and stationery. All of these are practically given to the customer without charge, and are therefore a dead loss.

During the past three and one-half years every sheet of paper and every yard of string has more than doubled in cost. In fact, paper of all kinds has advanced to nearly thrice its pre-war value. Thus a sheet of ordinary brown wrapping paper costs 2 cents, whereas before it cost only a quarter of that sum. In tying

our parcels there was an average waste of eight inches a parcel, which means that the assistant snipped the string so that she allowed a four-inch surplus on either side of the tie. This was thrown down behind the counter and was a dead waste. In other words, we were wasting 12,000 yards of string a year.

The wastage of paper in the shops was so great that five tons of paper were collected weekly by the sweepers and sold as waste. Before the war this brown paper fetched $75 a ton, now it fetches $275 a ton.

We are eliminating a large amount of this waste by teaching our assistants more scientific methods in the wrapping of parcels. And we have been able to effect economies all along the line by:

1. Training raw assistants in the whole of their duties before they ever go behind the counter;
2. Getting the older assistants to attend lectures at stated intervals.

But we came to the conclusion that after the extravagant assistant, the extravagant customer was the real trouble. In other words, the average citizen shopped in an unsystematic, slovenly, and labor-making way. We are training him—and her—out of this by gradual and imperceptible degrees. The fact is, the department stores have been far too generous to their customers in the past. We have simply encouraged stupid, unscientific methods of shopping, in our eagerness to meet the whims of the public. In so doing, we have not only eaten into our legitimate profits, but we have taught the public habits which we should not.

Delivery is the first great difficulty. The amount of money that we used to spend on delivery simply astonishes us now. In the case of mail customers, we used to pay carriage for a 62-cent order and upwards. Then we raised the limit to $2.50. The result was that it

encouraged country customers to send us single orders worth $2.50, instead of a series of small orders. We cut down our town deliveries from seven to four a day. We find that customers appreciate the four just as much as they did the seven. The saving of staff consequent on these changes amounted to 100 men—25% of the total delivery staff. We saved labor on delivery, and we also stopped c. o. d. unless for orders over $1. During sales we now do no c. o. d. work at all. These changes have not damaged our sales in the least.

As a result of these various changes we are saving $15,000 per annum on delivery, and probably about the same amount on packing.

At the commencement of the war our staff amounted to 5,921 people, roughly about 3,500 men, and 2,400 women. At present our staff numbers 5,738, of whom 3,635 are women and 2,103 are men. Of the men, it should be said that 1,704 are either under 18 years of age or over 41 years of age. That is to say, only 15% to 17% of our men are in the prime of life. About 3,200 of our men have joined the forces since the outbreak of war.

We find that there is almost nothing a woman cannot do in a department store, apart from heavy work, and certain types of mechanical work. Women clean our fish and poultry; women clean our windows; women drive our motor cars; women look after our lighter stocks; women call up taxis for our customers. And it may interest you to know that we have women buyers earning over $5,000 a year, and twelve women department heads earning an average salary of $2,800 a year.

In considering methods that reduce standing charges, it has been particularly necessary to train our women employees in habits of accuracy and economy. There are 14,000 lamps in our premises, and lighting costs us something like 37 cents a minute, or $60,000 a year. We

are satisfied that 25% of this could be saved if employees would switch off the light when it is really not required for business purposes.

Another matter in which we have been able to effect savings is that of inquiries. We deal with 1,000,000 ready money and account debits a month, and during a recent month tested specially, we had 2,100 inquiries. That is, there was one for every 32 orders. This is largely caused by the inexperienced staff which we have to employ under war conditions. We believe that we could save at least $25,000 on this alone, by training our young assistants to write clearly.

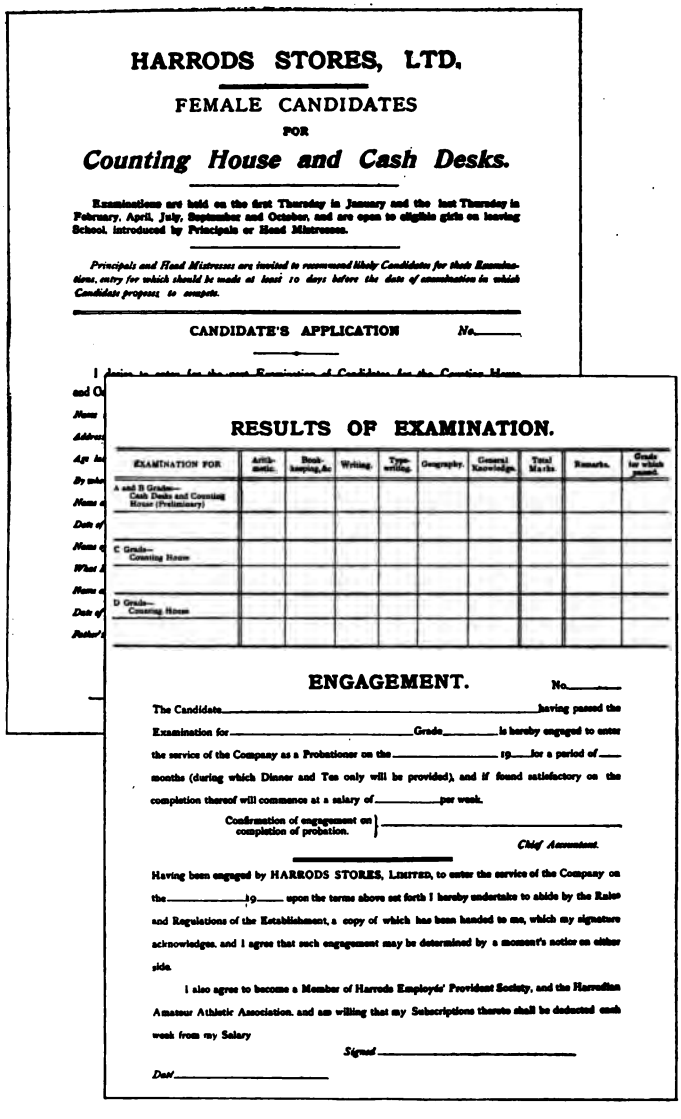
HERE ARE SOME OF THE ECONOMIES WAR FORCED ON THIS BUSINESS

But the larger saving we have been able to make is that which I indicated above, caused by training our customers to shop systematically. Take telephone orders, for instance. It was quite a common thing before the war for a woman to ring us up in the morning with an order for lunch; in the afternoon with an order for tea; and in the evening with an order for dinner. Now we point out to our customers that this is wasteful; also the government has helped us by putting up the prices of telephone calls 33⅓%. Consequently, such a customer will give the complete order in the morning, thus saving us:

(a) Two thirds of the time spent by a girl at the telephone taking the order.
(b) Two thirds of the time on bookkeeping.
(c) Two deliveries eliminated.
(d) Perhaps half of the labor and expense of packing.

Our telephone calls are now down about 33%.

Then we have notices all over the stores which read: "Kindly assist us by taking small parcels with you."



HARRODS STORES, LTD.

FEMALE CANDIDATES

FOR

Counting House and Cash Desks.

Examinations are held on the first Thursday in January and the last Thursday in February, April, July, September and October, and are open to eligible girls on leaving School, introduced by Principals or Head Mistresses.

Principals and Head Mistresses are invited to recommend likely Candidates for these Examinations, entry for which should be made at least 10 days before the date of examination in which Candidate proposes to compete.

CANDIDATE'S APPLICATION No._____

I ... to enter for the next Examination of Candidates for the Counting House and C...

Name ...

Address ...

Age last ...

By whom ...

Name and ...

Date of ...

Name of ...

What ...

Name and ...

Date of ...

Father's ...

RESULTS OF EXAMINATION.

EXAMINATION FOR	Arithmetic.	Book-keeping, &c.	Writing.	Type-writing.	Geography.	General Knowledge.	Total Marks.	Remarks.	Grade for which passed.
A and B Grades—Cash Desks and Counting House (Preliminary)									
C Grade—Counting House									
D Grade—Counting House									

ENGAGEMENT.

No._____

The Candidate_____ having passed the Examination for_____ Grade_____ is hereby engaged to enter the service of the Company as a Probationer on the_____ 19____ for a period of____ months (during which Dinner and Tea only will be provided), and if found satisfactory on the completion thereof will commence at a salary of_____ per week.

Confirmation of engagement on completion of probation. } _____

Chief Accountant.

Having been engaged by HARRODS STORES, LIMITED, to enter the service of the Company on the_____ 19____ upon the terms above set forth I hereby undertake to abide by the Rules and Regulations of the Establishment, a copy of which has been handed to me, which my signature acknowledges, and I agree that such engagement may be determined by a moment's notice on either side.

I also agree to become a Member of Harrods Employés' Provident Society, and the Harrodian Amateur Athletic Association, and am willing that my Subscriptions thereto shall be deducted each week from my Salary

Signed _____

Date _____

In order to place women workers to best advantage in its various positions, Harrods, a London department store, uses blanks like the upper one. The new workers are also examined, and the results are recorded on sheets like the lower one.

THE LATE SIR RICHARD BURBIDGE, BART.

"It has been our endeavor to teach 'scientific management' in shopping, both to customers and staff—to eliminate all waste motions."—The Late Sir Richard Burbidge, Bart.

As a result our customers themselves carry practically all light packages, and our electric trucks are used only to carry heavy parcels.

This is only one direction in which we have educated the public to consider us, and to avoid waste movements in shopping. We also counsel them to shop ahead. For instance, women who formerly gave us an order every day, have in many cases now reduced that to one order a week. The saving of time and labor to us is simply prodigious, and scarcely believable.

In a word, it has been our endeavor to teach "scientific management" in shopping, to eliminate all waste motions, both on the part of the shopper and of our staff in every department. I feel sure that you, in America, can also reduce the work done by your staffs. We do not find that our customers in any way resent being educated in these matters.

One of the things you may look for is a change in public taste. We find that where once a woman customer bought a 12- or a 15-guinea costume, she now buys one at 8 or 10 guineas. In fact, the wealthier classes are dressing more quietly than they have for a decade at least; and it was necessary to be ready for this change of taste a certain length of time before it occurred, in order to get the advantage of supplying the new demand before competitors were ready for it or, indeed, could meet it.

You will probably be astonished to learn that clients of ours who bought butter at 50 cents a pound now buy margarine at 29 cents. And so fashionable has thriftiness become that it is more profitable for a great store to cater in big value at a low price even to the wealthier classes, than to attempt to keep very high class goods on the counter at exorbitant prices.

I believe that this will happen in America, for, not only will food become scarcer, the world over, as the

war goes on, but so will all manner of materials. Consequently, everyone will have to become thriftier. And that store will win in every town which is ready to meet the new tastes and to make use of them judiciously to its own advantage.

BUSINESS should be at the highest pressure in all trades engaged in supplying government or allied needs or the wants of working people. In this latter class I include all who work, whether they are employed in factories, on farms, or in shops. I do not include that class who have been the wealthy of the nation. The burden of taxation will fall upon the rich and many articles of luxury formerly purchased by them will go unbought. The worker will be prosperous. High wages will be paid, and, in spite of the cost of living, the worker will enjoy a surplus larger than ever before.

IRVING T. BUSH
President, Bush Terminal Company

CHAPTER VIII

HOW ENGLAND MET SIX IMPORTANT WAR-TIME BUSINESS PROBLEMS

By LORD ABERCONWAY of Bodnant

Lord Aberconway of Bodnant is probably the largest employer of labor in Great Britain. He started life as a commoner. He was made a Baronet in 1902, and was created first Baron in 1911. He is the chairman of the Metropolitan Railway Company, of the Tredegar Iron and Coal Company, and of the huge Glasgow shipbuilding concern, John Brown and Company, which has built many of the largest liners afloat.

THE first difficulty that faces the business man on the coming of war is the blow to credit. But one is able to say, in view of our experiences in Great Britain, that if the government of a country supports the banks, credit will remain practically unaffected. The question of a moratorium also arises. But it was adopted only to a certain extent in this country, although to a much greater extent in France. Its power has hardly been felt in England, as it was chiefly confined to payments for rent, arising in the case of tenancies. In the United States, since the thought of the country was well prepared for war, there was little probability of a moratorium, and small shock to credit.

The next problem to face the business man is the enlistment of his bright young men. As a result of this, the individual business has often been hard hit. But we have found that we can, to a large extent, supplant

the skilled worker by the unskilled, and the unskilled worker by women. Women's labor, as a rule, is much more satisfactory and conscientious than that of the unskilled men. Such is my own experience, and I suppose I am one of the largest employers in this country. This does not apply to the more highly skilled types of labor, nor to the foreman class. Women work with greater zeal; they are untrammeled by labor traditions; and they are "out," as you would say, to make as much money as they can.

In some businesses it has been very difficult to find foremen recently. But there are always men who are competent to take up foremen's jobs, in the companies with which I am concerned, chiefly for the reason that our foremen are usually over age. Many concerns would find it advantageous to appoint an understudy, or "subforeman" for each employee's place, so that there may be available an ample supply of men trained to fill these supervision places, in case they are vacated by men who go into government service.

Another problem which especially worries business men during war time is that of buying. Theoretically, of course, it is wise to buy large stocks, to provide for the rainy day ahead. But it has been found in this country that, where the government has taken possession of manufacturing establishments, as in the case of those controlled by the Ministry of Munitions regulations, it has used up the stocks provided through the foresight of the manufacturer very quickly, simply allowing the prices paid for them, however much their value may have risen. In any case, as the legislature limits profits during the war by taxation, it is not always of marked advantage to buy in the cheapest, and to sell in the dearest market. That has obtained very much in this country during the war, but it is understood that, in a case where the government has made use of stocks of

cheap material purchased before the war for contracts undertaken at that time for private individuals, the government will, when fulfilment of the contract is completed, reimburse the manufacturer for the loss which he has suffered, through fulfilling a pre-war contract on material purchased at war prices. The same thing applies to pre-war contracts which were taken at low prices, and the execution of which has been suspended during the war, owing to government interference.

Another problem which confronts the business man whose country is at war is the squaring of his national obligations with his personal interests. Many firms have been monopolized by the government for making war materials, which had never before performed that class of work. They have lost practically the whole of their former trade and their good will. It follows that these establishments, when the war is over and the government ceases to be the buyer, will find themselves stranded without an order book, and faced by great difficulties in the task of returning to the manufacture of their original types of product.

PERHAPS HERE'S AN ANSWER TO A PROBLEM YOU ARE FACING

From this fact there arises a problem—how can one switch a concern over from the making of one product to another with the minimum of loss? It must finally be a matter of whole-hearted cooperation on the part of managers and workpeople. In my engineering and shipbuilding concerns we have never found any difficulty in transferring our machinery and labor from one class of work to another, provided it is something in the same line or comparatively so.

You could not turn a shipbuilding yard into a locomotive-building establishment. But you could make a great many parts of an aeroplane with the machinery

in use in such a yard. Many American manufacturers will find that it is possible for them, with their present equipment and machinery, to produce commodities different from their usual output.

Next comes the question of providing for the relatives of employees serving with the forces. What most employers in England have done is to give the wife of the man who has enlisted a certain weekly sum, which, with the separation allowance she receives from the army, brings her weekly income nearly up to its former level. At the same time it has guaranteed to the man joining the forces that his post will be open for him on his return, if he desires it, and will not be given finally to any person engaged to carry on his work during his absence on service.

In the case of employees of the higher grade, such as the salaried officials, we usually pay half salaries. But the number of dependents these men may leave behind affects their cases. Where small salaries are concerned, sometimes the whole amount is paid. In the case of the higher salaries, of course, other considerations apply, and smaller grants are made where the men are receiving really large amounts.

And here a word of warning. We did not expect that the war would last so long, and we wished to be as generous as possible in financing the men by our allowances to relatives. But it early became obvious that it was the duty of the government—that is, of the taxpayer—and not of the employer, to provide temporary pensions, which were becoming a very serious charge on many concerns. Once established, however, they could not be modified without creating bad feeling. When the war began we were still in the traditional state of mind, no doubt existent in America, which regards the army as a section of the state. Now, however, the whole nation, as taxpayers, bears the whole expense of, and incidental

to the war. In other words, employers who acted generously at first should not be handicapped in competition with employers who did not provide for the dependents of their enlisted employees.

This deduction also applies to the military hospitals, and many other war charities, which really come within the scope of army organization, and should not rely on the generosity of individuals. I know that American administrators realized the vast problem before them at the outset, when they were laying down their war-time organization and planning ahead.

On the whole, up to now, the result of the war has been to increase largely the output and the profits of all businesses in this country, certainly of all manufacturing businesses. There has been no difficulty in filling order books; the real difficulty has been to deal with the orders that come pouring in.

As the war wears on, bankers will doubtless feel an increasing responsibility to make loans with a view to cooperating in the national defense. This means much more than subscribing to the government's continuous issue of bonds and notes. It means that there must be the same discrimination in the allotment of credit that the railways contemplate in the division of cars. Every dollar in America must be employed to its fullest utility, just as every train must carry the last ton that it can move.

R. L. RUTTER
President, Spokane and Eastern Trust Company

CHAPTER IX

HINTS ON HANDLING WAR-TIME BUSINESS

By LORD AIREDALE OF GLEDHOW

Lord Airedale of Gledhow is one of the great ironmasters of Great Britain. His iron and steel products are known in every quarter of the globe. He believes that the iron and steel industries of America have a glowing future ahead of them. He is head of Kitchen and Company and the Airedale Foundries. This message of his to America is by no means confined to the iron and steel trade, however.

THE American steel and iron industries are already so ably organized that I hesitate to offer any guidance to its leaders and rank and file on handling war conditions. America is so well stocked with gold that there can be no grave shock to credit in any firm or business. And, thanks to your vast resources of men, material, and machinery—the sinews of war—you have none of the very complicated problems of this country to face, however long the war may last.

But there are one or two points, drawn from my experience in the iron and steel industries here, which may possibly be of interest to you.

It seems likely that you will be called upon to assist the Allies with many men at the present juncture. If you are, you can probably release large numbers of men for military service without severely incommoding your industries.

But it is essential for you to have your productive

capacity screwed up to the limit. For I believe that your greatest service will be given after the declaration of peace. I should say you ought to prepare yourselves, to the best of your ability, for the task of re-creating Europe into pre-war condition.

You are not harassed to the same extent by our labor conditions; you will be in a very good position to take advantage of the big opportunities that will naturally arise for the immense work of reconstruction in France, Belgium, Russia (including Poland), Serbia, Roumania, and perhaps others.

It is a mistake to imagine that Great Britain and the other belligerents will be in a position to do enormous work of this sort. In the first place, it is likely we shall all be retaining very large standing armies which will deplete our man-power. In the second place, we shall still be suffering from the immense numbers of men lost, maimed or otherwise incapacitated for full activity. In the third place, we shall be taken up, every one of us, for years, with getting even with the necessary maintenance work, which we have shelved for three years. For instance, none of our railways has done any but essential repairs to its system and its rolling stock since the outbreak of war. For one thing, they have not the men; for another, the government has limited them to making only the most urgent repairs. The same thing applies to roads, canals and general factory equipment.

No American industries have a brighter prospect, therefore, than your iron and steel trades. They will be able to take up the vast contracts for laying railroads that have been torn up, for making new rolling stock to take the place of that which has been damaged or destroyed; they will be able to supply material for rebuilding houses, schools, churches and all other essential devices of civilization destroyed by war.

The European nations will be so much occupied with getting their own houses in order that the reparation of the devastated countries will offer a wonderful field to America, during the process of Europe's reconstruction and rehabilitation, for it is the only nearby industrial country with labor and machinery free to take on such contracts. American manufacturers, therefore, even at the present time, should be studying the nature of the probable European demand for commodities and merchandise for the purpose of reconstruction. They should be planning what they can produce or market which will meet that demand.

There is one thing that the war has taught us here in Great Britain. That is the capacity of women for industrial work. I am satisfied, from my experience, that if we started to train women when they are quite young, at the age when we make boys apprentices, they could do an immense amount of work in engineering trades, apart from machine minding, and the simpler duties they now perform.

The same thing applies to clerical work. Women are doing the clerical work in the London City and Midland Bank, of which I am a director, with the greatest possible success. Some of these young women, I am informed, have become managers. Here again, training is all that is necessary to equip women for very important work. As the American labor shortage becomes acute, you may be able to meet the situation by the employment of women. American women, with their quickness, alertness and self-reliance, should prove highly competent in many fields.

I need hardly point out to you how the employment of women increases your productive capacity, apart from any shortage of male workers, by leaving men more free for the more productive and highly paid work. Incidentally, the appearance of women in well-paid and

fairly skilled labor acts as a tonic to men, and makes them ambitious to do work which they would otherwise regard as beyond their abilities.

I feel that, after the war, the whole British industrial machine is going to work at much higher pressure than before it. Profits will be smaller, as the incidence of taxation will be very severe; we shall have less time for leisure; less money to spend on our pleasures. Consequently, I think that you in America will, in the course of a decade or two, find yourselves competing in the foreign markets with much more efficient European rivals than you have hitherto known. In the case of Germany, I am afraid you will have to face undercutting unparalleled in the history of business.

But of the three or four splendid years which lie ahead of the steel and iron industries after the war will make them, at least, easily able to compete with the best brains and the best machinery in Europe.

THE business situation will be dominated by the war and the energies of this country must be concentrated as fully as possible upon winning the war. It is unevitable that this necessity will affect some lines of business infavorably. In the aggregate the production of the industries both in quantities and values will be enormous; they will be greater than ever before; employment will be complete and the aggregate of payments in wages will be far ahead of any previous year.

FRANK A. VANDERLIP
President, National City Bank of New York

CHAPTER X

THE BIGGEST WAR-TIME TASKS FACING AMERICAN BUSINESS MEN

By Sir George Paish

Sir George Paish is the Editor of *The Statist*, and he was the British government's trade representative to America four years ago, when he outlined in System, the Magazine of Business, his work in connection with the foreign exchanges. Possessing an unrivaled knowledge of trade statistics, Sir George Paish describes here just how, where and when America can help the Allies.

THE first essential in a great emergency is to act upon the experience of that wise man of old who realized that strength, whether of men or of nations, comes from "quietness and confidence," and one cannot doubt that the American nation upon their state of war with Germany will continue to show that wonderful "quietness and confidence" displayed by them and by their president since the war began, nearly four years ago. The wisdom they have so far displayed convinces me that the actual state of war will have no untoward effect upon their economic and financial position other than that which will subsequently come to all nations after the war is over.

The immediate effect of the state of war upon American trade and prosperity will be beneficial, for money will circulate as never before, owing to the gigantic purchases of the American government and the Allies, upon the American markets, and business men of all

kinds and descriptions will enjoy sales greater than they ever expected to deal with; indeed, the only limit to their business will be the limit of the nation's productive power after calling into play the contribution which the women can make to its maintenance and increase.

In Great Britain the war expenditures have meant that the spending power of the country has risen from something like £2,400,000,000 per annum to about £3,600,000,000, and that the fortunes of private persons have increased as they never increased before. This is shown by the ability of the nation to raise over £2,100,000,000 for war and governmental purposes in a single year, and to provide about £1,500,000,000 of it by the issue of war loans subscribed for by bankers, insurance offices, business firms, and private persons. War means trade activity, not depression; the depression comes after the war when the destruction of life and of wealth by war is keenly felt.

In great Britain the outbreak of war caused a temporary dislocation of business because it was so unexpected; in America war had been expected for some time and no dislocation of business whatever was likely to occur, such as that which took place in Europe in 1914. Moreover, cash or short term payments are the usual thing in America, and, consequently, there was not the same uncertainty that existed in Europe as to the effect of the war on the power of individual firms to meet their pre-war engagements. For, in Europe, long terms of payment are ordinarily granted. As a matter of fact, the uneasiness as to the solvency of individual firms in Europe was quite unwarranted, for the war has made the business of practically everyone not only greater but more profitable.

Moreover, the present time finds the banking position in the United States exceptionally strong, so strong indeed that bankers will be able to meet easily any de-

mands that may be made upon them. Not only are the cash reserves of bankers unusually great, but the creation of the Federal Reserve Banks has given the whole banking and currency system of the country an elasticity and strength that it has never hitherto had, and has rendered the banking system of the United States able to meet exceptional war demands as easily and speedily as they have been met by the banks of Europe. This means that the American business man will continue to be able to secure ample credit at his bank, in spite of the war. Financially the American people could not be better prepared to play the part they have so valiantly decided to play than they are today, thanks to the sound financial policy they and their government have pursued so ably in recent years.

WAR-TIME BUSINESS FACTS THAT ARE HELPFUL AND TIMELY

A nation does not need less banking accommodation in war than in peace. Indeed, it needs a great deal more, but it requires it for a different purpose. Business men will have no difficulty in collecting accounts from their customers, as the government, which will buy on a great scale, will pay cash for everything it purchases; and as cash payments will be the order of the day, business men will not need much additional banking accommodation in order to transact a much larger business. But bankers will have to assist in placing government loans by lending money to their customers to enable them to subscribe, and to meet the instalments when due. Further, manufacturers may need to make extensive additions to their works, and bankers' loans will be needed to enable these additions to be made. And, moreover, manufacturers will need to carry greater stocks of raw materials and partly manufactured goods in order to increase their output, and more banking accom-

SIR CHARLES CHEERS WAKEFIELD, BART.

"At this historical juncture," says Sir Charles Wakefield," the old axiom 'experience is the best teacher' is peculiarly applicable. The United States is in a position to benefit from Great Britain's."

Even in the transmission of the mails English women have been able to help out. Here is one of the first women drivers to enter the Royal mail service.

The miniature elevators and conveyors shown here take the work from machine to machine. And the work is performed more quickly than if a truckman did it.

modation will be needed to enable these materials to be purchased and carried until they become fully manufactured goods and can be turned into cash on delivery.

It is possible, however, that the government will see its way to supply a part of the money needed to provide it with goods after the first process of manufacture is completed, and may also make advances for the purpose of securing the necessary extension of manufacturing plant and machinery with the least possible delay, but this will doubtless depend upon circumstances, and on whether or not bankers will be prepared to find sufficient money for the purpose.

It is obvious, however, that as the American nation continues to put its mighty strength into the work it has undertaken a great deal of banking accommodation will be needed by manufacturers, and that this can, and will, be readily supplied by American bankers, or by the American government, or by working in cooperation with each other.

In brief, the participation of the American people in this world struggle will bring into play the moral and material resources of an enlightened nation of 102,000,000 persons possessing an annual income, at the current level of prices and wages, of not far short of £10,000,000,000 a year, and possessing a farming and manufacturing equipment which will enable the nation's productive power to be increased with great rapidity. In what direction and in what manner the American nation will decide to use its giant strength it is not desirable for an outsider to speculate, but of this I am convinced, that President Wilson is as well acquainted with the fundamentals of the situation as the leading statesmen of Europe, and that he will not fail to inform the American people as to the work that needs to be done, and the manner in which the American nation can employ its strength to the greatest advantage.

He will know that victory over militarism will depend as much upon the world's farmers in general, and upon those in America and Canada in particular, as it does upon the armies at the front; that the German submarine campaign is directed not only to starving the allied nations, but neutral nations also; that the one thing now essential to success is that not only the peoples of the belligerent nations should exercise careful economy in food consumption, but that the whole world should become economical, and that the greatest immediate work which the American people can do in fighting the German submarine campaign is to become just as economical as it is possible for them to become in their consumption of food, and thus to set free for the use of the allied nations as much food as the submarines destroy.

Owing to the depletion of the carried-over food stocks and to the shortage of the American winter wheat crops, the world's food supply has been greatly curtailed in the last year, and owing to the war, Europe's acreage devoted to the production of food for this season is dangerously reduced. Will the American people rectify this situation? Will they share with the peoples of the allied nations who have been fighting the battle of humanity so strenuously, the burden of making the world's food supplies last out in the current season by the exercise of the most stringent economy; and will they render invaluable help to the whole world in now placing under cultivation the largest possible acreage, in order that the world may be supplied with sufficient food to maintain life and that the world food famine which threatens may be averted?

Upon the exertions of the great American nation in these directions will depend not only the early conclusion of this great and dreadful war, but the well-being of the whole race in the years of food scarcity with which the world is now threatened, in consequence

of the great disturbance to the economic life of the world caused by the world-wide war.

In periods of financial crisis in the past the American people have reduced their food consumption about 20%. If they will do this now, they will set free for the purpose of supporting life in other countries upwards of 100,000,000 bushels of wheat and a vast quantity of other foods in the course of a year.

Will the women of America and Canada band themselves with the women of Europe into a great organization in this time of privation, for the prevention of waste throughout the entire period of food scarcity, both during the remainder of the war, and after it is over, and thus possibly save the lives of greater multitudes than will be lost in the war?

THE paramount business of the United States at this time is the winning of the war; and the activities of the American people are directed to this end. The production, manufacture, and transportation of those articles which are necessary for the maintenance of the population of a nation engaged in war and for the support of its armies in the field must be stimulated in every possible way.

HON. W. P. G. HARDING
Governor of the Federal Reserve Board
of the United States

CHAPTER XI

SOME LESSONS THE WAR TAUGHT ENGLAND

"Practical Lessons of the War," by a special commissioner of *The Engineer* (London) and "Eclipse or Empire?" by H. B. Gray and Samuel Turner (published by Nesbit and Company, Limited) are among the most interesting works printed in England on the business reactions of the war. Mr. Turner is managing director of Turner Brothers, an English aluminum manufacturing concern. Some of the principal points emphasized in these two works which will be at least suggestive to thoughtful American business men are given here.

THAT cooperative measures assisted by the government are necessary if Germany is to be distanced in foreign trade after the war ends, is the first point stressed in "Practical Lessons of the War." Others are:

That the complete diversion from many plants of their regular products in order to produce war munitions may make it difficult for these concerns to resume their regular lines when peace returns.

That many of the hands now being broken into munition plant work will result in a serious problem when hostilities cease, for the training they are getting will not be of permanent use to them.

That the war will thin the ranks of the best laboring class and lead to labor troubles after the return of peace, unless proper action is taken.

That, despite the threatened labor shortage, once the war ends manufacturers will have on their hands large plant extensions, erected to care for war-time demands,

which they will have to keep busy by means of increases in output or face ruin.

That during the war many concerns, forced to direct all their attention to war-time demands, will lose contact with their regular customers.

That the Germans, despite all the pressure they are under, have been able in many cases to keep in contact with their foreign customers through neutral countries. Also that the Germans, even as they fight, have under way detailed plans for strangling their competitors commerically on the return of peace.

That customers will demand unusually extensive credit when the war ends and trade is resumed on a more or less normal scale.

That the signing of the peace protocols will be in effect the declaration of a tremendous commercial and industrial war—the war after the war. And that, therefore, German trade should be regulated and restricted by the terms of peace.

HOW MANY OF THESE POINTS ALSO MIGHT BE APPLIED TO AMERICA?

Among others, "Eclipse or Empire?" stresses these points for consideration:

That 40 years ago Great Britain was the workshop of the world, but is no longer. The authors hold that the chief cause of this change is the lack of an educational system sufficiently practical, in point of instruction in applied science and the like, to result in the maximum benefit to industry and commerce.

That, according to the authors' investigations, during the last 20 to 40 years most of the inventions, new ideas, and developments have been given to the world by countries other than England; that their value has been more quickly appreciated and put to practical use outside of England.

That low production per worker is the cause of low wages, and the long train of consequent effects, in England; and that England suffers from underconsumption due to underproduction. That during the last 30 years Germany's wheat production has increased 50%, but England's (island grown only) decreased 20%; that in the same period the yield of wheat per acre in England has remained about stationary, while in Germany it has increased 40%; that during these 30 years stock raising has also held about stationary in England, but has gone up 33⅓% in Germany; that in 1865 Great Britain produced 500% as much iron and 225% as much steel as Germany, while in 1913 Germany produced 200% as much iron and 250% as much steel as Great Britain; that the average worker in this country produces from two to three times as much as the average worker in England, and has from two to three times as much machinery back of him; that 30 years ago England could produce coal about 50 cents a ton cheaper than we could here in America, but that by 1912 we could better England's price by about 75 cents a ton; and that, with millions of men withdrawn for military duty, England is producing more than before the war started.

That England, in order to recover her lost industrial leadership, must readjust so as to turn at a faster rate the principles and theories of science into its ascertained facts, for, the authors point out, "any thoughtful man of business knows that, directly scientific knowledge is applied to the problems of production and organization, so surely are all previous estimates of possible earnings outdistanced to such a degree as would seem fabulous to the uninstructed mind." The authors point out that many of the world's greatest inventors originated in minds fed by English blood and firmly hold that an application of the remedy they suggest, in such a fa-

vorable environment, will quickly regain for England the place which they feel she has lost through industrial laxity springing from too great prosperity.

The work closes with this appeal:

"Yet it is something hardly short of revolution that our people need today—revolution in their social, political, economic, commercial, and industrial outlook—and, above all, in their educational system.

"We are the heirs and the trustees of the greatest empire in the annals of the world. Let this not be a mere phrase to us and nothing more. Our fellow citizens in this imperial heritage have proved, by evidence which can never be blotted out from the page of history, all that this has meant to them."

* * * *WAR has become a thing of industry and commerce and business. It is no longer Samson with his shield and spear and sword, and David with his sling; it is no longer selected parties representing nation, as champions, and in physical conflict one with the others but it is the conflict of smokestacks now; it is the combat of the driving wheel and of the engine, and the nation or group of nations in a modern war which is to prevail is the one which will best be able to coordinate and marshal its material, industrial, and commercial strength against the combination which may be opposed to it.*

NEWTON D. BAKER
Secretary of War

CHAPTER XII

WHAT CAN THE BUSINESS MAN LEARN FROM THE SOLDIER?

Laurence R. Dicksee, professor of accounting and business organization in the University of London, has written an interesting book—"Business Methods and the War," published by the Cambridge University Press—in which he analyzes military methods in search of suggestions of value to the business man. Here are given some of the points to which he calls attention.

THAT the results obtained by most concerns would be improved if they made the relation of their accounting departments to their entire organizations correspond to the relation of the Royal Engineers or the Army Service Corps to an army, is the first deduction made by Professor Laurence R. Dicksee in his book "Business Methods and the War." Professor Dicksee urges that the other departments look upon the accounting department as a friend and ally, that the accounting department be given a standing in keeping with the work it can accomplish, and that the accounting department staff be properly paid and officered.

That the army recruit is much more systematically trained than the industrial recruit, and that, as a result, the percentage of effective soldiers in an army is higher than the percentage of effective workers in most industrial organizations. Professor Dicksee holds that military training encourages greater application, and rewards the best men more surely with promotion than the average commercial training.

That while the attitude of business men indicates that they feel the state system of education should turn out fairly effective workers for their organizations, the military men find they must develop their men themselves. Professor Dicksee feels that, given the right sort of training, the military men find that the grade of "raw material" going into the personnel is not of vital importance.

That something approaching the military system of training—drill, in other words—might advantageously be introduced into business. Professor Dicksee finds that drill makes common movements so routine that more freedom for observation is obtained and much brain fag avoided. He points out that many aspects of "scientific management" take advantage of drill.

That—having the use of bands by military forces in mind—music might well be used to a greater extent in business so as to secure more rhythm in workers' movements.

That every organization to secure the best results must be able to adapt itself to varying circumstances, to contract or expand within wide limits. From his analysis Professor Dicksee is led to point out, in this connection, his belief that "business houses might often occupy their periods of industrial depression to better advantage than they do, if they invariably occupied those periods in overhauling their methods, and devising better ones for the handling of business on a large scale later on." He calls attention to the fact that the military establishment is called upon to expand more drastically under pressure than a business organization, and says: "It is a very open question whether it is a sound business policy to curtail normal expenditure, when this can only be done at the risk of greatly increasing the normal expenditure that will have to be faced later on."

That often business men say they are "too busy" to make up accounting records and statements which show them where their businesses really stand. Professor Dicksee adds: "In civil life the times when one is 'busy' are usually the times when one is making good profits, even if the methods employed are defective—and when, accordingly, the results of even defective methods are probably sufficiently good to prevent those methods being criticised as they really ought to be." He points out in conclusion the advisability of having in every business someone to criticise existing methods and to devise improved ones.

YOU will realize, as I think statesmen on both sides of the water realize, that the culminating crisis of the struggle has come and that the achievements of this year on the one side or the other must determine the issue. It has turned out that the forces that fight for freedom, the freedom of men all over the world as well as our own, depend upon us in an extraordinary and unexpected degree for sustenance, for the supply of the materials by which men are to live and to fight, and it will be our glory when the war is over that we have supplied those materials and supplied them abundantly, and it will be all the more glory because in supplying them we have made our supreme effort and sacrifice.

WOODROW WILSON

PART TWO

HINTS FROM EXPERIENCE WAR WORK GAVE ENGLAND

CHAPTER XIII

POINTERS GAINED MANUFACTURING MUNITIONS

Collated by the Editorial Staff of SYSTEM, the Magazine of Business

Here are the main conclusions reached by the Health of Munition Workers Committee of the British Ministry of Munitions after completing several careful investigations. This committee was appointed "to consider and advise on questions affecting the personal health and physical effectiveness of workers in munition factories and workshops." The results of these investigations of the committee and its recommendations have been published in pamphlet form and presented to Parliament. These results and recommendations form a part of the preparedness lesson the British bring to the United States, and, as such, are worthy of consideration by every employer of labor—and particularly of factory labor. Only the principal of the facts established are summarized here, but the more detailed information contained in any of the reports can be had upon application to the editorial offices of the A. W. Shaw Company. The first topic summarized is that of special industrial diseases.

UNUSUAL precautions must be taken to safeguard the health of the worker engaged in the manufacture of high explosives. The work, involving, as it does, the use of lead, fulminate of mercury, ether, nitric acid, and other poisonous elements and compounds, exposes workers to special diseases, some of which have a high mortality rate, which may result from inhaling fumes or dust, or by general absorption. Nitrous fumes are especially deadly. A close medical watch should be kept upon workers for symptoms of diseases. There should be provision for emergency treatment.

Much of this danger is obviated by these precautions:

(a) Periodical examination of workers by a physician, who should have power to suspend from employment any persons affected; (b) Adequate washing facilities should be provided—dirt should be removed before poison is absorbed through the skin; (c) Smoking should be prohibited where poisons are of such a nature that they may enter the system through the digestive tract; (d) Workers should not be allowed to take meals in work rooms; (e) Women workers should wear head coverings; (f) Adequate ventilation should be provided where the work is of a dusty nature—in some cases respirators should be used, and, where the dust is particularly poisonous, the work should be done in glass cupboards with holes for the introduction of the hands; (g) Emergency oxygen helmets should be provided where there is danger of escaping nitrous fumes; (h) Workers should not be allowed to start work before eating; (i) Where the process causes a tendency to skin disease, the skin should be protected by gloves, face coverings, and the like; (j) There should be provision for emergency treatment of workers, with medical assistance quickly available at all times.

An increase in the number of workers employed in an industrial plant usually means an abnormal increase in the sickness and injury rate. A full and accurate record should be kept of all cases; it is then possible to plan preventative measures. Workers should be instructed in personal hygiene and the wisdom of "safety first" methods. They should be drilled in first aid treatment. Where possible there should be medical assistance attached to the factory. Excessively long hours, particularly at night, if continued, usually produce sickness. Poor lighting, inadequate ventilation, and prolonged muscular strain are causes of sickness.

Welfare work should be carried on by specially trained employees. The best welfare work tends to make con-

ditions of labor satisfactory as regards wages, health conditions in work rooms and at home, and the treatment of employees by immediate superiors. The welfare worker should be the medium between employer and employee for the consideration of questions of any nature. If handled in the right spirit, welfare work in the smallest factory and humblest organization will show good results in the character and well-being of workers. Best results are obtained where there are women welfare workers for women.

Sunday Labor: There is evidently a consensus of opinion among both English employers and employees that Sunday labor is bad. The objections to it may be broadly classified under three heads: (a) Administrative—Supervision is difficult and imposes a severe strain on the foremen; (b) Economic—It usually means higher wages, coupled with increased running expense. Though attendance is generally good it is not always accomplished by a satisfactory individual output. Sunday labor frequently means bad attendance on other days of the week; (c) Religious and Social—There is considerable general feeling that the seventh day, as a period of rest, is good for mind and body. It is, therefore, recommended that Sunday work be confined to emergencies. In the case of women and young persons Sunday work is particularly to be deplored and should be obviated.

Baths for Workers: Washing benefits the health and, therefore, the effectiveness of all workers. It has a beneficial effect upon their self-respect. Experience shows that when opportunities for washing are provided they are freely used. Where periodic baths are of special benefit to health and effectiveness—as they are in many types of munition work—it is desirable to allow workers time for bathing in working hours. As a general thing adequate washing facilities means the provision of lavatories or bath tubs, a plentiful supply of hot and cold

water, brushes, soap, and towels. Separate towels are much to be preferred over those of the roller type, in the opinion of the committee.

Ventilation and Lighting: Effective ventilation of factories and workshops is essential to the capacity of the worker. To be effective ventilation should provide a working atmosphere which should be: (a) Cool rather than hot; (b) Dry rather than damp; (c) Diverse in its temperature in different parts, and at different times, rather than uniform and monotonous; (d) Moving rather than still. Generally there is more danger from overheating than from underheating. Localized ventilation is essential where there is excessive dust.

The essentials of good lighting are: (a) Adequacy; (b) A reasonable degree of constancy and uniformity of illumination over the area of work; (c) The placing or shading of lamps so that light from them does not fall directly on the eyes of an operator when working or when looking horizontally across the work room; (d) The placing of lights so as to avoid the casting of extraneous shadows on the work. Natural lighting is always to be preferred; where practicable roof lighting is generally preferable to lateral lighting.

Plant Lunch Rooms (Canteens): The effective plant lunch room should be accessible and attractive. It should furnish food varied in nature, fresh and good, suitable in quality and sufficient in quantity; well cooked, appetizing, and at a low price. The results of the installation of plant lunch rooms are substantial, indisputable, and widespread. Where they are maintained there has been a marked improvement in the physical condition of workers, a reduction in sickness, less lost time, less tendency to alcoholism, and increased effectiveness and output. In almost all large plants it was found that at least 25% of the workers, in the interest of health and vigor, needed lunch accommodations at the plants. Investigation con-

SIR GEORGE PAISH

"War means trade activity, not depression," says Sir George Paish. "In America war had been expected for some time and no dislocation of business whatever is likely to occur."

An English hardware merchant used various articles from his stocks to make an imitation "Zeppelin." An American merchant learned of his idea and used the similar display shown above.

Contrast the slow and costly way of loading a freight car shown above, with the labor-saving method illustrated in the photograph below.

These electric trucks do in a shorter time and with fewer men the loading work that three men are shown doing, slowly and with greater effort, in the upper photograph.

vinces that this group of ill-fed workers accounts in a large degree for such marked inefficiency as exists, and that its energy and output is reduced in the absence of suitable feeding arrangements.

The construction of a lunch room naturally depends mainly upon the ability and willingness of a firm to make the necessary financial expenditure. It is impossible, in limited space, to go into the details of construction and equipment found most suitable by the British investigation. This information, will, however, be furnished on application to the A. W. Shaw Company. In many instances the British government aided in the financing necessary for the erection of lunch rooms.

Boy Workers: A medical investigator for the committee, after examining the boys employed at a large steel works, reported as follows:

"For the most part they are so spiritless, so dull, so dead in look, so woebegone and attacked with weariness to a dulling of their spirits, as to compel attention. In a large measure these conditions are due to circumstances outside the workshop; there is practically no parental control in many cases and the boys go to bed very late, sometimes after midnight."

On the other hand, the same investigator reported as follows of boys employed in a factory, where, though the hours were long and wages low, conditions outside the factory were highly favorable:

"The response of the nervous system to good living conditions and the keeping of seasonable hours, manifests itself in the large percentage of boys who feel fit and fresh on rising, although most of them arise at 5:15 or earlier. They all have food before they report for work and they come from homes, which, though small, are well situated; that is to say, there are no squalid courts, no back-to-back houses, no sordid surrounding areas. These boys are an example of what juvenile work-

ers can be, when under parental control and proper living conditions. About 50% of them are employed for more than 60 hours per week and yet find time for healthy recreation after hours, and at the week end if possible."

Another investigator of boys employed in munition works says: "Boys are, in many cases, drawing on their last reserve of strength. This is due, I think, to excessively long hours. They often have no leisure, no recreation, and no classes. What is to become of them after the war? Too big a price is being paid for output no matter what our need."

In considering what hours of employment are reasonable for boys it is necessary to distinguish between boys over and under 16 years of age. Investigation showed that boys between 16 and 18 were very much stronger than boys under 16. Boys under 16 are probably more delicate than girls of the same age. Essential safeguards to their health are short hours of employment and welfare work.

SOME FACTS THAT SHOULD BE CONSIDERED IN HANDLING YOUNG WORKERS

An attempt should be made to discover the work for which a boy is best suited. The fault in earlier training must be obviated in the factory life. In one successful factory, the boys on entering are placed in a room in which are machines of all kinds. They are under very careful supervision, and they are moved from machine to machine, and the result noted. At the end of his probation period a very fair estimate of the boy's ability can be formed. This "grand tour" of the machines gives the boys an insight into the whole work of the plant, and at the same time stimulates their interest in technical education and impresses them with the variety, instead of the monotony, of factory work.

Employers cannot take too much interest in bettering the juvenile workers' living conditions, the committee feels. Sleep, of course, is a vital consideration. Most boys need eight hours, and nine is better. Investigation at large munition centers showed that out of 33 boys in one factory only three had a room to themselves, the majority shared a bed with at least one other person, and in a number of cases three persons occupied a bed. One boy, aged 14, slept in the same bed with two young men; two young girls slept in the same room. In some cases beds were occupied by day as well as by night. Such housing conditions merit employers' gravest consideration.

Constance Smith, a woman factory inspector, says: "Young boys and girls show almost immediately, in my experience, symptoms of lassitude, exhaustion, and impaired vitality under the influence of employment at night and of long day hours."

The committee recommends that young boys and girls not be worked at night, except in case of emergency.

In the past the need for welfare supervision for boys has not been so widely recognized as in the case of women and girls; it is now, however, receiving the attention of an increasing number of employers.

In this connection the following statement of duties assigned to the "boy visitors" in the plan of welfare supervision for boys at the Royal Ordnance Factories at Woolwich Arsenal is of interest. The "boy visitors" act practically as assistants to the welfare supervisor.

The "boy visitor" by personal guidance works toward getting contented, well-disciplined boy workers, and the information he gathers is always available to assist the staff in the smooth working of the factory. His duties are as given below:

1. To meet new boys on entry and keep a record of their progress and career in the factory.

2. To deal with absentees and bad timekeepers—first with the boys; then, if necessary, with parents.

3. To see boys before dismissal and, if necessary, to see the parents.

4. To investigate shop and police reports and make recommendations thereon.

5. To keep an eye on the feeding arrangements, dining rooms, lavatories, and the like, and report and make suggestions on them to the welfare supervision department for its action.

6. To inquire into and discuss with the boys their complaints and troubles, and present them to the proper authorities for consideration.

7. To inspect the general conditions and health of the boys, and, where necessary, arrange for medical inspection and attention.

8. To suggest suitable candidates for convalescent homes after sickness and injury.

9. Where necessary to visit the homes of boys who are evidently ill-cared for, and report upon the home conditions and suggest remedies.

10. To encourage and arrange for recreations and sports at spare times.

11. To keep in touch with boys by means of individual talks; advise them in difficulties; encourage them to thrift and well doing.

12. To gather information as to boys' characters, and progress, and capabilities for promotion and for post-war employment.

The "boy visitor" has no executive authority and it is emphasized that great tact is necessary in his relations, as the boys' friend, with the foreman and officials. He should clearly show to the officials that his work will not in any way reduce their authority, but will strengthen it and help to secure efficiency and discipline in the factory.

In a general way the handling of young boys and young girls should be much the same. Both should be interested in their work at the start; efforts should be made to see that they are well fed and well housed; they should be encouraged to thrift and welldoing; the work should be kept well within the bounds of their strength and endurance; and their health should be carefully watched and conserved.

* *Lady Superintendents:* Perhaps no class of British women workers came to the front more quickly under stress of war-time conditions than did lady superintendents. While male workers remained so vastly in the majority, as in peace times, it was but to be expected that the activities of women executives would be more or less overshadowed, but with the war and the influx of woman labor into munitions plants the lady superintendent began to come into her own and she has held it ever since. An official report issued by the Health of Munition Workers Committee of the British Ministry of Munitions has this to say of lady superintendents and their duties:

When lady superintendents were first appointed in factories they were not given official positions. Their first duties were confined chiefly to promoting and providing recreative and educational facilities for workers and visiting them when they were sick.

It was not long, however, before progressive employers realized the value of lady superintendents and began to give them a definite position in the business organization. Where large numbers of women are employed some employers now consider the lady superintendents the most important officials of the staff. Here are some of the important duties lady superintendents often assume:

*It will be noted that "lady" is here used as indicative of sex only—not to indicate rank in the social sense.

1. She often hires all women and girl workers. This is considered a highly important task. When a lady superintendent can make workers feel that they are not mere tools, but human beings whose conduct, effort, and influence really count, and especially when a country is at war, inestimable benefit results. The hiring of em-

Identification Number	Name	Nature of Illness or Injury	Date	Instructions
221	Mary Hurd	Crushed thumb	25-11-15	To come tomorrow.
			26-11-15	To come tomorrow.
			30-11-15	To come on 3-12-15.
			3-12-15	

Here is shown a record from the "case" book of one English plant. Closely following up injury cases in this way helps in getting the worker "fit" once more to take up his or her war-time duties.

ployees by a lady superintendent also furnishes a valuable connecting link between the business and the "social" sides of the work. It is especially important that the lady superintendent be consulted in the hiring of foreladies.

2. The lady superintendent should keep careful record of broken time (time lost by the worker through any cause) and seek to remove such cause, whether it lie in the factory or outside.

3. She should pass on discharges before they are made. Thus overhasty discharges often are avoided and the lady superintendent's inquiry also may bring to light undesirable conditions. Also, disciplinary measures of the plant should be approved by her before being put into effect.

4. While it is not suggested that the lady superintendent should set wages it is suggested that she know them as oftentimes unfairness in payment for work is

detected by her when she is informed about the wages paid for the different work.

5. All women workers' complaints of any nature first should be heard by the lady superintendent. It usually will be found that she can settle nine tenths of them immediately, and without consulting higher authority.

Identification Number	Date	Name of Injured Person	Nature of Illness or Injury	How Caused	Progress of case with dates of subsequent dressings, and the occurrence of any sepsis	Date of Final Dressing
221	25-11-15	Mary Hurd	Crushed thumb	Fall of shell	25-11-15; 26-11-15; 30-11-15	3-12-15

Above is reproduced a case indentification card like those given injured workers in an English plant. The worker must produce the card for inspection each time the physician dresses the wound.

6. The lady superintendent should oversee general working conditions; should make recommendations about work she considers unsuitable. Also she should make general recommendations tending to promote worker's comfort, as, for instance, recommending the provision of more seats in the work rooms. She should exercise full authority over cloak room and lavatory accommodations.

7. Close supervision of women and girls and working conditions, working at night is one of the most important duties of the lady superintendent. Sometimes oversight is lax during the night shift and where women are employed it is especially important.

8. The lady superintendent should supervise the lunch room arrangements. Where the plant conducts the lunch room it often will be found advisable to place it directly under her control. She also should supervise rest or recreation rooms, as well as be in effect a general health inspector, cooperating vigorously with the medical and nursing staff.

9. The lady superintendent should help girls or women coming from a distance to find suitable rooms. She also should learn the transportation facilities available to women in coming to and going from work, with a view to recommending betterments for the consideration of the higher plant authorities.

10. In war time especially it is very desirable that workers should have plenty of both outdoor and indoor recreation and often the lady superintendent can advantageously organize and supervise a recreation club. In some instances she also can help by visiting women who are sick.

* One manager says about lady superintendents: "I want to know that the women and girls I employ are working under good conditions, but I, of course, cannot watch every detail. My lady superintendents can, however, and do. They are guided by their own tact and common sense and they come to me for help but very rarely, and always with good reason.

To sum up, experience indicates that plants which adopt this plan find that lady superintendents are not a mere luxury. On the contrary they perform a useful service; they relieve the management of a mass of difficult detail, and they increase output by promoting the health, effectiveness, and happiness of workers.

However, the Health of Munition Workers Committee of the British Ministry of Munitions stresses the point that women supervisors should be properly trained and adequately educated to their task before being inducted into industrial life—should not be pitchforked into the midst of a number of women workers, with only the bare instruction to "go ahead and supervise."

*A list of books, useful alike to employers who have, or are about to institute, supervision of women by women, and to women desirous of entering work of this sort, will be found in the bibliography.

In this connection it is suggested that at the beginning, a woman supervisor may profitably be trained, in many instances, by placing her with an experienced supervisor over a period—say one month—before actually handing the managerial reins over entirely to her. This plan of training women supervisors has been adapted successfully in many British plants.

One British munition manufacturer says about women supervisors: "It always should be remembered that women supervisors must be handled differently than men occupying positions of like importance. While we are considering the rank and file of women workers let us not forget that the supervisor, herself, needs holidays, rest periods, and the like, if best production is to be secured. At some plants where the ordinary workers are really well handled on these points, the women supervisors are worked too long hours and too hard. It is true that in most instances this is due to the fact that good supervisors are difficult to obtain, but whatever the cause, the practice should be stopped as, eventually, output is sure to suffer."

IT is essential that you should have your productive capacity screwed up to the limit. For I believe that your greatest service will be given after the declaration of peace. I should say you ought to prepare yourselves, to the best of your ability, for the task of re-creating Europe. . . . . You will be in a very good position to take advantage of the big opportunities which will naturally arise for the immense work of reconstruction in France, Belgium, Russia (including Poland), Serbia, and Roumania.

LORD AIREDALE OF GLEDHOW

CHAPTER XIV

HOW WORKING HOURS AFFECT OUTPUT

Collated by the Editorial Staff of SYSTEM, the Magazine of Business

Here are facts and figures about industrial output in relation to the number of hours worked. They are assembled from a report of the Health of Munition Workers Committee of the British Ministry of Munitions, which in turn is based on an extensive investigation among Great Britain's munition plants. It will pay every employer to study this information—it bears directly on the question of industrial effectiveness upon which our government is rightly putting so much stress.

WHAT relation does the number of hours worked weekly by industrial operatives hold to the maximum production over extended periods?

The Health of Munition Workers Committee of the Britsh Ministry of Munitions has attempted to answer this question in an extensive survey of munition plants, the results of which have been compiled in statistical tables by H. M. Vernon, M. D., Fellow of Magdalen College, Oxford, and University lecturer.

This investigation is particularly interesting in America, confronted as we are with war-time industrial conditions which may parallel those of Great Britain. In fact, it constitutes a part of that lesson in industrial preparedness which England brings to the United States.

With but one exception the output of day shifts only was investigated, and investigation was confined to munition plants where labor conditions, such as lighting, heating, and ventilation, were as favorable as possible. All classes of operators in the plants were on piece work,

high wages were paid, and there were no labor union restrictions. Hence there was every stimulus for workers to exert their maximum power of production.

The output for six months of 100 women turning aluminum fuse bodies was considered first. They stood all day at capstan lathes and the operation required close attention and some delicacy of manipulation. Previous to the period during which this investigation was carried on, the hours of labor had usually been 77¼ per week.

From Table I it will be seen that in the six-week period just before Christmas the actual hours of work averaged 68.2 or 6.6 less than the nominal hours. It will be noted that in the week and a half before the Christmas holiday, output rose 6% above the average for the previous few weeks, but in the half week immediately following it, fell 11% below this average. Both of these variations are typical of output in relation to holidays, while another typical feature is the rise which follows a holiday. In the present instance this rise amounted to 11% more than the average for the pre-Christmas period, the total output reaching its absolute maximum for the investigation period—7,615 per week. And the beneficial effects of this holiday undoubtedly lasted four weeks.

From February 27, the hours of labor were 66½ per week, and 58½ in the second week of each month, when there was no Sunday labor, but during an eight-week period the hourly output averaged 23% more than in the pre-Christmas period. The total output, 7,343, was 8% more than in the pre-Christmas period in spite of the hours of labor being actually 8.5 less. It is probable that the 60 hours worked per week were still too many to give the best total output, but at least they justify the statement that *in order to obtain a maximum output*

women engaged in moderately heavy manual labor should not work for more than 60 hours per week.

But it is even possible to go a step farther in this same direction. Investigation showed that a reduction in the hours of these fuse turners, from 60 to 56, had no adverse effect on output. This, because there was an equivalent reduction in time lost from sickness or taken off because the workers felt fatigued. Thus it seems probable that 56 hours of work per week is the absolute maximum for work of this type and that, if anything, it errs on the side of excess. It must be remembered, of course, that this type of work is heavy for a woman, and requires women of robust physique.

In the next type of munition work investigated the operatives were milling a screw thread on the fuse bodies. This necessitated standing at semiautomatic machines, where they removed one screw and inserted another every minute or so. The muscular effort was moderate and simple in character and took up only about a fifth of the time required for the total operation.

This work was much less strenuous than fuse turning. The average records, as shown in Table II, indicate that the hourly output varied in the same direction as that of the fuse turning, but to a much more limited extent. In the three weeks after Christmas it was only 6% greater than in the five weeks before it, and, since the average hours of work were somewhat shorter, the total output remained practically unchanged. Probably the best number of hours is something between the limiting values investigated, or about 62 hours.

Male munition workers, as a rule, do considerably heavier work, but making allowance for their greater strength and endurance it was found that their output was similarly affected by a reduction in the hours of labor. One of the most fatiguing types of munition work is that of "sizing." In the sizing of fuse bodies,

Week ending	Actual hours of work per week		Nominal hours of work per week	Hours of broken time per week		Relative output per working hour		Hours of work x relative output	Remarks concerning output
Nov. 14	62.0		67.5	5.5		98			
Nov. 21	68.8		75.5	6.7		99			
Nov. 28	66.7	68.2	75.0	8.3	6.6	102	100	6,820	Hourly output fairly steady.
Dec. 5	70.9		77.2	6.3		96			
Dec. 12	69.1		76.2	7.1		99			
Dec. 19	71.8		77.3	5.5		107			
Dec. 26	41.8		46.0	4.2		105		.....	Typical rise in hourly output before holiday.
Jan. 2	32.8		.....	.....		89		.....	Great fall in output just after holiday.
Jan. 9	65.2		69.3	4.1		113			Subsequent considerable increase of hourly output, whilst total output rises to a maximum, 12% greater than that of pre-Christmas period.
Jan. 16	70.3	68.6	77.2	6.9	5.7	107	111	7,615	
Jan. 23	70.3		76.3	6.0		112			
Jan. 30	62.4		68.5	6.1		111			Reduction of hours of labor from 74.3 to 67.5 has an immediate effect on hourly output, hence a considerable reduction of total output.
		61.1			5.9		107	6,591	
Feb. 6	60.8		66.5	5.7		102			
Feb. 13	49.2		52.0	2.8		108		.....	Temporary shortage of material and reduction in hours of labor.
		48.4			3.6				
Feb. 20	47.6		52.0	4.4		106		.....	
Feb. 27	61.4		66.5	5.1		118		.....	
Mar. 5	62.2		66.5	4.3		125		.....	
Mar. 12	54.8		58.5	3.7		127		.....	
Mar. 19	62.1	59.7	66.5	4.4	4.6	121	123	7,343	Effect of shorter hours of labor now established, and hourly output reaches a maximum. Total output 8% greater than in pre-Christmas period.
Mar. 26	60.4		66.5	6.1		121			
Apr. 2	58.6		64.8	6.2		121		.....	
Apr. 9	54.9		58.5	3.6		121		.....	
Apr. 16	62.9		66.5	3.6		126		.....	
Apr. 23	47.0		49.5	2.5		125		.....	Typical rise in hourly output before holiday (Easter).

TABLE I: 100 WOMEN TURNING FUSE BODIES

STATISTICAL PERIOD	Average hours of actual work	Average hours of broken time	Average (relative) hourly output	Hours x output
5 weeks preceding Christmas (November 15 – December 19)	67.4	4.4	100	6,740
2 weeks at Christmas (December 20 – January 2)	44.7	3.5	98	.....
3 weeks after Christmas (January 3 – January 23)	63.7	3.0	106	6,752
4 weeks later (January 24 – February 20)	53.1	2.6	104	5,522
8 weeks later (February 21 – April 16)	59.3	3.6	109	6,463
2 weeks at Easter (April 17 – April 30)	39.4	2.7	108	.....
3 weeks after Easter (May 1 – May 21)	59.8	2.6	112	6,698

TABLE II: 21 WOMEN MILLING A SCREW THREAD

STATISTICAL PERIOD	Average hours of actual work	Average (relative) hourly output	Hours x output
6 weeks preceding Christmas (November 8 – December 19)	61.5	100	6,150
2 weeks at Christmas (December 20 – January 2)	38.3	89	.....
6 weeks after Christmas (January 3 – February 13)	51.1	109	5,570
8 weeks later (February 21 – April 16)	55.4	122	6,969
2 weeks at Easter (April 17 – April 30)	41.0	112	.....
3 weeks later (May 1 – May 21)	56.2	124	6,969

TABLE III: 27 MEN SIZING FUSE BODIES

the article is usually subjected to four separate operations, in each of which it is clamped to a small flywheel and handle, and is screwed through a steel tap so as to cut a screw thread on it.

This requires no manual dexterity, but there is a great and continuous strain on the muscles of one arm and shoulder, as well as the back. The workers seldom use both arms, preferring to keep the operating hand dry, and use the other one for picking up the oil-covered fuse bodies. The output of a group of 27 operatives was investigated and the results are shown in Table III. The hours worked were always shorter than those worked by women, never exceeding 71 hours a week, and seldom including Sunday labor.

APPARENTLY HOLIDAYS MAKE FOR INCREASED PRODUCTION DESPITE TIME LOST

The table shows there was a marked drop during the Christmas fortnight and a considerable rise for the first week after this fortnight, but that there was only a 9% increase in average output during the six weeks after Christmas in spite of the fact that the weekly hours were 10.4 shorter. Evidently the operatives took a long time to adapt their rate of production to the longer hours, for the hourly output subsequently averaged 22% in excess of that of the pre-Christmas period. This caused the total output to be 10% greater, and it is probable even this figure does not represent the full beneficial effect of reducing the hours, for after Easter the hourly output rose 2% and the total output to 13%.

The effect of a reduction in hours of work on nine boys sizing steel base plugs for shells was even more marked. A reduction from 70.3 hours to 57 hours brought about an increase in hourly output in approximately four months of 55% and 38% in total output. The boys must have been very seriously overworked by the

long hours. This instance cannot be considered typical, but it is a vivid example of how overwork accumulates fatigue and reduces output.

Of course the type of work performed has everything to do with the number of hours which can most profitably be worked. For instance, 23 men boring powder chambers for three-inch shrapnel shells produced approximately 18% more output in a 60-hour week than during a 48-hour week. This work can be described as moderately heavy. Again, 22 men engaged in the heavy work of finishing, turning, and forming three-inch shells, working 51.8 hours a week over a period of four weeks averaged a 14% increase in production over an equal previous period during which 60.3 hours were worked during each week.

On still lighter work than any previously mentioned, that of boring top caps for shells, and which was done by boys 15 to 18 years old, it was found that 70 hours a week produced the maximum output. This operation is done by means of semiautomatic machines. About four times a minute the boys unclamped one cap from the machines and clamped in another. Men engaged in rough turning shells, slightly heavier work, also probably produced the maximum in a 70-hour week.

For a final comparison of results the various types of labor investigated may conveniently be divided into five classes: very heavy, heavy, moderately heavy, light, and very light. Of these types the "very heavy," such as sizing fuse bodies, and the "heavy," as in boring powder chambers, is not suited to women.

On the other hand the "light" type, as in rough-turning three-inch shells, should be confined to women or younger boys, as it is a waste of muscle if men or even youths are employed at it. Of course the "very light" type of work, such as boring top caps, is obviously best adapted to women and girls.

It appears plainly that for men engaged in the very heavy labor, as in sizing fuse bodies, the maximum weekly hours of work should be 56 or even less; for men boring powder chambers and in turning and finishing shells, they might well be probably 60 or even slightly more; while for men rough-turning shells and youths boring top caps, they should be 70 or even more. On the other hand, for women at the moderately heavy work of turning fuse bodies the maximum hours could be held to 56 or less, while on the lighter labor of milling a thread screw they might be slightly over 60 hours.

It must be realized that all these data are provisional, but they clearly justify the conclusion that the hours of labor should be varied between wide limits according to the character of work performed, if greatest production be obtained. It also suggests that not only are women unsuited to the heavier types of work, but that even on lighter work they are unable to stand as long hours as men ordinarily are.

THE PRINCIPLE OF FITTING THE HOURS TO THE TYPE OF WORK

It should be borne in mind that the hours cited are the maximum hours of actual work, supposing a maximum production is required regardless of production cost. They impose a great strain on the operatives and thus the data quoted necessarily refer to the fittest, those who were strong enough to survive in the struggle, and not the great mass who tried out their hand at munition work. On this account it is fair to conclude that the best hours of work—such as would be suited for peace times—are in every case considerably shorter, although the general principle of graduating the hours of labor to the type of work should always hold.

We have seen by actual examples the marked effect the number of hours worked has upon output. Let us

now go on to a more general discussion of the subject, basing it also upon the results of investigations made in British munition plants.

"All overtime is bad," said the general manager of a large firm. "We only work overtime when urgency drives and even then our men become disorganized and it is doubtful if our output is at all increased."

On the other hand those in charge of plants where the men work 15 hours a day and sometimes Sunday as well, often insist such hours are not excessive and cannot be reduced without loss of output. They point out that these hours were also worked in time of peace. It is noticeable, however, that employees who have given careful study to industrial fatigue and scientific management favor shorter hours, and no case has been reported where long hours were returned to, once the short hour system was adopted.

Overtime is commonly justified on the ground of the scarcity of labor and the need for increased output. It is contended that even though the output per hour may not be maintained, the system does result in increased production. The most highly skilled workers, such as tool setters and tool and gage makers, have usually been employed on overtime, and at one time it was common for such men to work 90 hours per week. Such hours, however, cannot be worked with impunity by any type of workers.

The objections to overtime, briefly stated, are: (1) It is liable to impose too severe a strain on workers. It has been proved that while in an emergency overtime is effective, after a period production usually decreases and the extra hours produce little, if any, additional output. Moreover the quality of the product may be adversely affected over the entire work period, and not alone in the hours of overtime; (2) It frequently results in lost time. In part this is to be attributed

Here you see one extreme to which the French had to go to meet the labor problem. These men are Annamites and are embarking for France and war work.

This is not a scene in the Far East—these men from the Orient are working for the Allies "Somewhere in France." The exact number of Oriental laborers in France is not available.

These men have been wounded and are learning new trades. We too may have to face the problem of placing maimed workers in industries where they can serve best.

Lack of knowledge of the other man's troubles is at the bottom of many intra-organization troubles. Daily committee meetings iron out these troubles in one American plant.

to workers becoming exhausted and resting, and also to sickness, noticeable chiefly among older men and those of weak constitution; (a) It imposes a serious strain upon the management, the executive staff, and the foremen, both on account of the actual length of the hours worked and the increased worry and anxiety to maintain output and quality. These men cannot take days off duty like ordinary workers; (b) It is liable to curtail the period of rest and sleep available for those who have to travel long distances to and from the work, a matter of special importance in the case of young persons; (c) The fatigue entailed increases the temptation to men to indulge in alcoholic drinks because they are too tired to eat, and seek a stimulant.

SOME REASONS WHY LONG HOURS HAVE NOT HAD MORE SERIOUS EFFECTS

It has not yet been found that the strain of long hours has caused any serious breakdown among workers, but there is medical evidence that they are beginning to make themselves felt upon the older men and those who suffer from physical infirmity. It is noticeable, too, that there is a general tendency toward a reduction of hours. There is good reason for believing that the increased pay, and the better food that workers have been able to enjoy in consequence, have helped to counteract the strain of long hours, and there is little doubt but that both men and women have been stimulated to increased effort by an appreciation of the national importance of their work. These influences have been summarized as: (a) Will power—Men have continued at work in a condition that under ordinary circumstances would have put them off for a week or two. Even when a man is off for a time he is anxious to get back again as quickly as possible. Practically all the men want to do their best; (b) Better wages mean bet-

ter food for a large number of men with families, and they mean a little better provison for those families, which reacts upon the man's health and his work; (c) The possiblity of getting more money has also its effect. There is quite a large proportion of workmen really too anxious for overtime—employers will corroborate—even under normal conditions.

It is a mistake, however, to depend too largely upon the operation of influences of this kind, or to hope that they can continue indefinitely to be effective against fatigue. If men work for 15 hours a day for weeks and months, one of two results must follow. Either the health of the workers will break down or they will not work at full pressure. In either case output suffers.

Among executives and foremen there already is evidence of considerable fatigue, and in numerous instances they have had to take special holidays to enable them to recuperate. It is hardly necessary to emphasize the importance of maintaining the health and physical efficiency of this class.

The question of hours of work has brought two distinct factions of employers into evidence in England; one favoring a 48-hour week and the other advocating much lost time is due to long work hours.

If the 48-hour week is to be a success, the reduction in hours must be accompanied by a reorganization in factory management, and this it is difficult to carry out under the present pressure of war necessity. On the other hand "the longer the hours the greater the amount of lost time" is a maxim which has been repeated again and again, and there is no doubt that much broken time is due to a sense of fatigue from long work hours.

There is, however, a middle course. It allows a maximum of 10 to 12 hours of overtime over a 60-hour week and has been found to operate satisfactorily.

Sound reasons for the adoption of this plan are set forth in the statement of a prominent trade union official which follows:

"Where there is overtime beyond two hours daily there is evidence of fatigue," he said. "Men cannot be economically employed from either a health or production standpoint on continuous overtime of three and four hours daily. Fatigue is rarely reaching the point of breakdown, but does affect health and production, and, in my opinion, will manifest itself later."

On the basis of facts learned during the investigation the following recommendations are made: (a) The average weekly hours exclusive of meal times, should not exceed 65 to 67, including overtime. Longer hours should only be worked for short periods and to meet emergencies. For work requiring close individual attention it may be desirable to fix an even lower limit of hours; (b) Where practicable the overtime should be concentrated within three or four days in the week, which should preferably not be consecutive; (c) Where overtime is worked it is important that there should be no Sunday work; (d) The practice prevailing in certain districts of working from Friday morning, all through Friday night and until noon on Saturday, should be discontinued. Such hours may be permissible for short spells, but cannot be satisfactory if continued for indefinite periods.

WHY BOY WORKERS USUALLY SHOULD NOT BE WORKED AS LONG AS ADULTS

Important as it is that hours of work for men should be kept within reasonable limits, it is doubly essential that hours of work for women and girls should be even more closely safeguarded. It is beyond dispute that women are unable to bear the strain of long hours as well as men, and opinions as to how many hours profit-

ably can be worked vary much less than in regard to those which can be worked by men.

The strain of long hours for women is serious, and continuous work in excess of the normal legal limit of 60 hours per week ought to be discontinued as soon as practicable, though some greater elasticity of hours might be allowed, as for instance, such moderate overtime during the week as can be compensated by an earlier stop on Saturdays. Much necessarily depends upon the character of the employment, upon the conditions, including factory environment, and piece work or time work, under which it is performed, upon the sufficiency of food, whether the workers can sit while at work, and upon whether they live close to the factory or have to undergo, in addition to their actual labor, the added strain of traveling in crowded conveyances to and from their work. The need for overtime among women and girls is much less pressing than it is for the ordinary run of male workers.

Ordinarily boys should work about the same number of hours as women, but war conditions have, in many cases, thrown them into positions as helpers to adult male workers and the pressure of necessity sometimes forces them to work the same overtime as men. This should be avoided wherever possible and boys under 16 should not be worked more than 60 hours per week. Substantial relief at the week end is essential for the boy worker and this relief should be arranged to permit of outdoor recreation on Saturday afternoon.

Where shifts can be arranged they are to be preferred to overtime. They involve less strain on foremen and workers. They enable the machines to be used during the whole 24 hours, and in addition produce a better and more uniform rate of output. Shifts are either double (day and night) or consist of three 8-hour periods in the typical plant.

Day and night shifts are not always of equal length. Where the normal hours of work during the day are less it is the usual custom to place the remaining hours in the night shift. The night shift should not exceed the day shift in length.

The 8-hour system of hours involves little or no strain upon the workers; the periods during which machinery must stand idle are much reduced, while significant statements have been made as to its beneficial effects upon output. Unfortunately, apart from any other reason, a shortage of workmen and the difficulties of supervision, as well as problems of housing and transit, to a large extent exclude 8-hour shifts from practical consideration at the present time, so far as male workers are concerned. The difficulties in the case of women are much less, and it is the more important to establish the 8-hour shift in their case, because women are now going into munition work who hitherto have been entirely unaccustomed to factory life, and who may find the strain of a 12-hour day too great, while they could work readily and effectively through an 8-hour period without bad after-effects.

Adult male workers are almost universally employed on double shifts. They appear on the whole to be standing the system well, especially where relief is given at the week ends.

Women workers are employed sometimes on 12-hour and sometimes on 8-hour shifts, but the latter arrangement is becoming more common. The strain of the 12-hour night shift for women is considerable, even where they are provided with seats, and the system should be abandoned wherever local difficulties of labor supply, housing, and transit can be overcome, and in no case should the hours worked at night exceed 60 per week, it was found.

Girls under 18 should not be employed on a night shift unless the need is urgent and the supply of women workers is insufficient. In such cases the employment should be restricted to girls over 16 years of age, carefully selected for the work.

Boys, like the men, are generally employed at present on 12-hour shifts. Care should be taken to watch the effect of night work on individual boys and to limit it as far as possible to those over 16.

HERE ARE SUMMARIZED SOME MAJOR OBJECTIONS TO NIGHT WORK

Although shifts are preferable to overtime work, this must not be taken as an unqualified recommendation for night work. Investigation shows there are many objections to night work, chief among them being: (a) It is uneconomical. Though wages are paid at a higher rate, the rate of output, especially during the last two or three hours of the 12-hour shift, is generally lower; (b) Supervision is frequently unsatisfactory. This is chiefly due to the fact that fewer and less-experienced foremen are often employed at night; (c) Conditions of lighting are seldom as good as in day time, and this makes fine work more difficult; (d) Workers experience great difficulty in sleeping by day, partly because of the dislocation of the ordinary habits of life, and partly because of the noises and disturbances which are almost inevitable in the day time; (e) The unfamiliar meal hours make it difficult for the workers to consume substantial food and their digestion is liable to become deranged.

With certain minor qualifications existing arrangements for spells and breaks of work in English factories are generally satisfactory and but few suggestions are made. Where work commences at 6 a. m. the ordinary breaks are half an hour for breakfast, and one hour for

dinner. At some factories work begins at 7 a. m. or 8 a. m., the workers being expected to have had their breakfast before their arrival at work.

There is no real objection to this system, though the earlier of these two hours is liable to involve a long spell of work, and even if the men have had a hearty meal before starting, the distance to be traveled to work may necessitate a long period from breakfast to dinner.

Where double shifts are worked, two intervals usually are allowed at night, one of an hour and the other half an hour; but in a number of cases the first interval is also reduced to half an hour. In this connection it is recommended that intervals amounting to not less than 1½ hours should be allowed. Night work is certainly more strenuous than day work, and it is illogical, therefore, to allow a reduced period for meals and rest during the night. These objections are particularly valid in the case of women, since they often experience difficulty in eating a proper meal at night unless they are allowed plenty of time, and they appear to benefit in other ways by the opportunity for rest afforded by the longer interval. It has been argued that as the workers have nowhere to go during the night, an hour at a time is too long. This objection would, however, be overcome by the adoption of two intervals of ¾ hour each, which would allow adequate time for taking a meal and at the same time not make either interval unnecessarily long. It is important that there should be some opportunity for rest and refreshment, particularly in the case of women, between about 3 a. m. and 4 a. m. The postponement of the second break until this hour helps the workers to get through the trying hours at the end of a night shift. Where women are employed on 8-hour shifts, an interval of half an hour is allowed, occasionally with a brief second interval. If no considerable part

of the time has to be spent in the preparation of the meal this interval usually was found sufficient.

It is important that the ordinary holidays should not be interfered with, even under the stress of war conditions. They afford a definite break in a long period of strain, and a favorable opportunity for recuperation. This opportunity could be used to fuller advantage if adequate traveling accommodations and railway facilities were provided for conveying large numbers of workers to convenient health resorts and holiday centers.

To sum up, it appears that after all, in war work as well as in peace work, "all work and no play" not only makes workers dull, but, far from increasing production, usually is a brake upon it.

I HAVE *always been bullish on the United States. I can see nothing ahead to make me modify my attitude; a tremendous significance attaches to how squarely we meet the problems, apparent or not yet apparent, which lie before us. We have, with the war and its questions of finance, production, and labor, quite enough to absorb the whole energy of the country at the present moment and also the additional energy that we shall develop as the war progresses.*

CHARLES M. SCHWAB
Chairman of the Board of Directors of the Bethlehem Steel Corporation

CHAPTER XV

A MANAGERIAL BY-PRODUCT FROM MUNITION WORK

Collated by the Editorial Staff of SYSTEM, the Magazine of Business

The war has proved a stimulus to better factory management in Great Britain. It is reasonable to expect that it will prove the same here. In this chapter, assembled from a report of the British Health of Munition Workers Committee upon the effect of industrial conditions upon eyesight, are facts it will pay American business men to read. The value of the work of the British Health of Munition Workers Committee as indicated by this digest, and by digests of similar investigations conducted by it—which will be found on other pages—is in its spirit, aside from the substantial value of its specific recommendations, worthy of the deepest consideration by employers. The committee's work, except for a very few investigations, many American employers could duplicate, at moderate expense, in their own plants. Investigations of the health of the workers, their living conditions at home, and the conducting of general welfare work, and the like, usually bring dividends in increased and better production, and that it is war time s an added reason for closer consideration of such a policy.

ABOUT 1,500 cases of eye injuries, sustained by industrial workers at their work, are treated annually at one English hospital. The majority of these injuries are slight, but even a conservative estimate of the time lost by each man places the average loss at half a day, or from 700 to 800 days' work lost annually.

Another hospital treats daily 20 men for eye injury sustained at work. Each of these men loses three days' work on an average; this represents 300 days' work in the course of a week, or approximately 40 men idle per week, from accidents which for the most part are entirely preventable.

Many other hospitals show an increase in eye injury cases of more than 100% in the last two years, and as a large percentage of such cases come from plants engaged in the manufacture of war munitions, the Health of Munition Workers' Committee of the British Ministry of Munitions has made an exhaustive investigation upon the effects of industrial conditions upon eyesight, together with possible preventive measures. Of course this increase in the number of eye cases is partly due to the increase in the number of workers as well as to their inexperience in metal working.

The committee found that industrial work may cause impairment of eyesight—with resultant loss to the employer—in these three chief ways; (a) injuries due to exposure to intense heat or industrial poisons; (b) accidents due to flying particles, and the like; (c) eye strain due to uncorrected errors of refraction or other causes closely allied.

Specific preventives and remedies for the first subdivision were difficult to define. The effect exerted upon the eyesight by some industrial poisons, such as lead, is in the bulk small, and the influence of prolonged exposure to intense heat and light usually takes a long period to manifest itself. Strict general medical supervision of the worker soon detects eye injury due to intense heat or industrial poisoning, and immediate treatment will lessen the resultant impairment.

Investigation of eye injuries due to accidents showed that in normal times, in any general group of industrial accidents, more than 5% were eye injuries, and in engineering factories this rose to 7%. Injury generally resulted from flying particles of metal, such as from lathe turnings, or from the bursting of emery wheels, and the like. Such an injury calls for immediate attention, and lack of care almost invariably leads to infection, which in turn may take the worker

from his bench or machine for a long period of time, cause a more or less serious impairment of sight, and in some cases even destroy the eyes.

Eye strain resulted from natural defects of vision or to the nature or conditions of the work and its effect upon efficiency and output was most serious. In one factory where fine machine work was done, and where the management had given considerable thought to the comfort of employees, it was found that out of seven workers, one suffered from severe and the other six from occasional, frontal headaches attributable to eye strain.

DEFECTIVE EYESIGHT IN ONE PLANT

This record of defective eyes in one Akron factory is probably fairly representative of average conditions and only emphasizes a subject not to be overlooked in the rush of war time

Normal both eyes	6,328
Normal one eye, $^2/_3$ other	542
Normal one eye, less than $^2/_3$ other	324
$^2/_3$ both eyes	350
$^2/_3$ one eye, less than $^2/_3$ other	220
$^1/_2$ both eyes	56
$^1/_2$ one eye, less than $^1/_2$ other	62
$^2/_5$ both eyes	87
$^2/_5$ one eye, less than $^2/_5$ other	51
$^{20}/_{65}$ both eyes	31
$^{20}/_{70}$ both eyes	40
$^{20}/_{100}$ both eyes	34
$^{20}/_{200}$ both eyes	10
Less than $^{20}/_{200}$	6
Total	8,141

Out of this number 21 were blind in one eye, five having the eye removed

In this plant, one worker wore glasses, obtained from an optician nine years previously, that were no longer corrective; 8% of the workers had been obliged to obtain glasses since starting the work, 12% found sight difficult at night, another 7% complained of eye strain, and an additional 2% found eye strain was increasing in severity.

All of these employees required and obtained treatment while on factory time. The lesson is that a rigorous optical examination before an employee starts work is often an economy.

Many conditions likely to cause temporary or permanent damage to the eyesight of industrial workers are admittedly preventable, while prompt and effective treatment of the injury will reduce suffering, hasten recovery, and lessen the chance of permanent injury.

Methods of prevention of eye injury consist, first, of general measures designed to improve the physical health of the workers, and to so enable them to resist the effects of fatigue; and, secondly, of special measures intended to avoid undue strain on the eyesight or to reduce the liability of accident to a minimum. General measures, such as the suitable lighting of factories, the furnishing of proper food, and arrangement of adequate time for sleep and rest, are well understood. In most factories, also, there is general medical supervision of employees.

When operatives are being engaged for fine work which calls for close attention, the eyesight of each should be tested. All who fail to reach the standard adopted, which should be decided upon through consultation with an occulist, should be sent to a specialist or eye hospital to be fully examined and, if necessary, supplied with glasses. When workers are supplied with glasses the nature of the work to be performed should be specified, if possible.

Sometimes it is possible to get at the underlying causes and eliminate the factors which produce flying particles. At one factory it has been found possible almost to eliminate accidents due to flying nails, which are particularly serious, by corrugating or scoring the heads of the hammers.

Under certain conditions the eyes should always be guarded from flying particles of metal. To be effective

an eye guard should: (a) Prevent particles reaching the eyes from the front, sides, or below. Practically nothing enters from above; (b) be light weight and comfortable, allowing free play of air so that moisture cannot condense on the lens; (c) not impede vision, or become obscured by the impact of particles; (d) be strong and cheap.

The fact that particles rarely enter from above is important because the upper part of the goggles may be left open to allow of ventilation.

Where fine work is to be executed there must be clear vision, and glass is by far the best medium.

Where there is exposure to bright light, as in the process of oxyacetylene or electric welding, the glass of the goggles should be tinted or specially prepared to obscure the chemically active rays at or beyond the violet end of the spectrum, otherwise irritation may result, and, eventually, injury.

First aid treatment is all that can be rendered effectively in the factory in case of eye injury, but as the subsequent history of the case depends largely on the way in which first aid is applied, every precaution should be taken to avoid increasing the injury by well-meant, but misdirected, efforts to give relief.

MODERN *war is fought in industrial terms. It is not a mere conflict of armed men, of tactics, of strategy, of generalship, and courage. It has become a vital rivalry of industrial systems and management of relative efficiency in production, transportation, and distribution. The grim, far-flung battle lines are an extreme periphery of industrial organizations, matching the resources of forest, field, mine, and factory.*

JAMES A. EMERY
General Counsel, National Council for Industrial Defense

CHAPTER XVI

TRAINING THE BOY WORKER

Collated by the Editorial Staff of SYSTEM, the Magazine of Business

It would be difficult to perform a better or more timely service for the country than to help conserve and develop the effectiveness of the boy worker. It is, of course, impossible for anyone to know how long this war may last or what degree of labor depletion it may eventually cause. This very uncertainty places a direct responsibility on the employer to take steps to maintain the effectiveness of his division of the industrial army, and circumstances may make the boy worker an important element in it. Boys in England have responded loyally to their country's labor need and in many cases are doing work which in the past was always assigned to full-grown men. The boy worker, however, requires treatment and training of a different type than the older employee if the employer and the country are to secure the best results. Here are the methods used to accomplish this object in Great Britain since the early months of the war. This description of them is based on a report issued by the Health of Munition Workers Committee of the British Ministry of Munitions.

SO much attention has been devoted in recent times to the girl worker that the boy worker has been somewhat overlooked. But the boy must be carefully considered in these days when "output" outweighs almost every other consideration. He must be adequately equipped for his life's work, and the task is often difficult. He is less amenable to discipline than the girl worker; he lacks the girl's tendency to obedience.

To bring the boy worker up to, and hold him at a high point of efficiency, these four steps must be taken:

He must be interested in his work and kept so.

He must be brought up to and kept physically fit.

He must be educated and trained to his task.
He must be under the right sort of supervision.

The first of these is probably the most difficult. As a rule, the factory does not interest the average boy. Often his individuality has been crushed in his early training and by the time he reaches the factory, he is inclined to regard his work merely as a means of making money, and not as a task through which he can ever make his mark in life. Interest in his work must be aroused, or he will deteriorate under the monotony of it.

A boy tends to think of the actual operation he is engaged upon—perhaps without any intelligent interest—but it wearies him both physically and mentally. As soon as this fundamental fact is realized, means of solving the problem can be found.

The following incident illustrates the need of fitting the boy to his work:

In one of the best organized factories in England every effort is made to make the best of every worker engaged. A young man applied for a job as a lathe hand, and was engaged; he proved a failure. He was then given a job as a window cleaner, and again failed. Finally he was placed in the office, where he proved himself to be an efficient and able clerk.

The boy worker must be kept physically fit, and the wise employer will take steps to see that his health is not undermined by excessive hours of labor. The ill effects of long hours do not necessarily reveal immediate signs of fatigue. The effect of prolonged effort is accumulative. Most employers justify their week-end golf or motor trip on account of the increased efficiency which results. What of the boy? He is in even greater need, for growing demands are being made upon his energy day by day in his early teens. He longs for exercise; he must "let off steam" somehow; his animal spirit must

be released, but in many cases he possesses neither accommodation, nor sane and sensible facilities for recreation that rests mind and body.

The result is that the boy wastes his leisure in unhealthy pursuits. His home is small and offers no scope for the indulgence of a hobby, and the street becomes his playground. Many firms have tackled the problem and provide means whereby a boy may enjoy reasonable recreation. A field for outdoor games, or a room where indoor games can be played are not expensive items. Further, the boy should be given an opportunity of connecting his recreation with his work. If, in his game, he can struggle for the firm, it gives him the interest in his job which creates that feeling of *esprit de corps* which is one of the most useful factors in industrial life.

PERHAPS THESE SUGGESTIONS FROM BRITISH FIRMS WILL PROVE WORTH WHILE

More than one English firm has attached to its organization a cadet corps; others, a troop of boy scouts. One firm which uses motor trucks often places a spare truck at the disposal of their scouts, so that the boys may spend their week ends refreshing their minds and bodies. The firm declares that it pays to have the boys return to their work on Monday morning strengthened by the life in the fields beyond the city, where Nature calls.

But physical fitness depends on more than recreation. There is the question of feeding. Some employers take not the slightest interest in this matter, with the result that many of their boys are endeavoring to build up sound frames on buns and lemonades. Others are satisfied when they have made provision for the heating of carried food, but a well-equipped lunch room where good, plain meals can be obtained at a reasonable cost, even though run at a loss to the firm, pays indirectly in increased effectiveness and output.

Some of "the men behind the lines" will be women. Already many concerns are employing them in large numbers to fill jobs left vacant by the fighting men. The woman above is filling bottles in a chemical plant. Note the use of a "gas mask."

This young English woman is contributing direct service to her country by drilling holes in shoes for army horses. Girls proved more industrious than boys at this work and are doing by far the greater part of it.

No less vital than these considerations is the general health of the boy worker. Usually he is medically examined before he is employed, or in any case very shortly after his admission, but often the record made is not followed up. For example, a boy with a consumptive tendency, weak eyesight, or a slight hernia, should obviously not be set certain types of work. Not only will he fail to do justice to himself, but he will probably decrease his efficiency to an alarming extent.

The boy worker must be educated to his task, and in dealing with this important problem the boy's parents should be interested in the possibilities of his career. Too often a boy is allowed to choose his own work and ruin his future. The desire to earn a big wage immediately is the chief concern of the parent and the boy, unless influence can be brought to bear in a wiser direction. The wisdom of holding him to progressive work should be explained both to the boy and to his parents. Unless steps are taken to do this—and no one can do it with the same authority as a representative of the firm —the temptation to earn a high wage in some "blind alley" occupation may prove too strong.

But, in addition to this influence, the boy must be given an opportunity of increasing his technical knowledge. Attempts should be made to encourage boys to attend evening schools. But, by the time the boy has finished his toil, he has little energy left for study. If his classes are to help him at all, he must go to them fresh and alert, and not with a wearied brain and fagged body. Some arrangement should be made so that the boy can attend technical classes during working hours. Several firms are doing it today, with the result that when their boys are trained, they are able to command better positions in later life. Some firms allow their boys time off, without pay, but if at the end of the term the boys have shown progress, this money is re-

turned to them. Others base the annual "raise" upon the progress made by the boy at his classes.

The boy requires supervision, and of a special kind. The root of many labor problems lies here. The only boy who is allowed to break away from definite control, at least in his early teens, is the working boy. At 14 he leaves school and discipline forever, for the authority exercised by a foreman is frequently perfectly useless.

"Unless a foreman can blaspheme decently," a so-called expert once said, "he can't increase output—the men think he's afraid of them." The boy requires a more extended control than this parody of authority. He needs guidance; he seeks a leader and a friend in his work no less than in recreation.

If his interest is to be obtained in his work, his actual entry into the factory must be a formal, showy affair. He must be made to feel that he counts for something.

If the boy's health is to be regarded, it must be somebody's duty to keep an eye on the various details referred to above. If his education is to be treated seriously, a member of the staff must be given the task of organizing and arranging a scheme of education. How is it to be done?

It is obviously impossible, when direction and control make constant demands upon his time, for the head of the firm to deal with this all-important question of making the boy an efficient worker, and the ordinary workman possesses neither the tact nor the training for the job. All those activities which concern the boy worker should be given into the care of an officer of the firm who is appointed by the firm, and responsible to the management. Here are 10 good reasons advanced officially in England for the appointment of a boy supervisor:

1. He can select the boy workers
2. He can bring them under definite, friendly control
3. He saves the management time in settling disputes, and
4. The boy can air his grievances
5. His parents become more interested in his future career
6. His health is under consideration
7. Technical education is stimulated without being obviously "forced" upon the boy
8. The boy is given a chance to save
9. The tone of the factory is improved
10. Recreation is organized.

One condition is certain. The supply of skilled workmen must be kept up and carefully augmented in order that this country may render a world service now and take a prominent place in the industrial world in post-war days. And where else will we recruit our men workers, except from the ranks of the boys?

IN England it is said that the war has brought the classes closer together. There has been a wonderful demonstration of the revolution that can be effected in industry by hearty cooperation between wage earners and proprietors, and it is confidently predicted not only that wages will never go back to the pre-war level, but that with higher wages the costs of production will be lower than ever. This is an achievement which can only be accomplished by enlisting the sympathy and good will of the workers and by convincing them that their own best interests are being served.

FRANK A. VANDERLIP
President, National City Bank of New York

CHAPTER XVII

THE SIX MOST IMPORTANT FACTORS IN MEETING WAR-TIME CONDITIONS

By A British Munition Manufacturer

The manager of one of England's largest munition plants hopes that these suggestions will aid American manufacturers—whatever their line. Applying these management ideas should result in legitimately increased production and should at the same time increase effectiveness, while rendering a real service to the cause of democracy. They are:

First: Exchange ideas and information with others.
Second: Avoid unusual activities outside of your line.
Third: Make adequate preparations before undertaking war orders
Fourth: Train women workers to take the places of men.
Fifth: Train understudies to take the places of executives.
Sixth: Hold frequent conferences with your department heads.

THE management problems presented to England's industries by the war were very similar to those which you in America now have to meet. We had to furnish tremendous quantities of material; the labor supply was depleted by the demands of the army, many of our executives were called from their usual duties for war service of one kind or another; inexperienced women and physically unfit men had to replace experienced workers; our plants were to put on work for which they were not fitted; and in many other ways our organizations were disorganized.

The methods we developed have, in a general way, been adopted by all kinds of business enterprises

throughout England. I believe that these lessons should be of immense value now to you American business men in helping you to start with the benefit of our dearly bought experience. The lessons are fundamental and will doubtless continue to be of value when peace comes again.

1. There must be absolute interchange of ideas, best methods and processes. Remember that in war time, concerns must not fight among themselves in competition; they must combine to fight Germany and thus to protect themselves. At first, plants engaged in munition manufacture spent large sums learning how to make highly specialized products, and many of them did not feel called upon to publish these methods. The attitude of one American manufacturer who, as I am told, said, "It cost me $100,000 to learn how to make shrapnel; why should I give this information to a competitor?" may have been excusable before the United States entered the war. Today it would be treasonable.

In England there is the freest interchange of information. Manufacturers are encouraged, in some cases compelled, to visit competitors' plants so that no time or money will be lost in developing processes which are already in use. This cooperation goes to great lengths in avoiding wastes. There is no such thing in England as a secret formula or process in making war material. A concern located near my factory was recently having exceedingly high rejections on a certain brass part on account of a chemical stain which they could not remove. It happened that we were making the same part, so when I heard of their trouble I voluntarily gave my competitor the chemical formula we used to remove the stain.

This firm really is a competitor; they bid against us on many contracts; but cooperation of this sort is sometimes good business. In the first place the army needed the parts; and the army is fighting to preserve all Eng-

lish industry; second, waste of raw material must not occur, as it does when parts are rejected; and third, a loss even to a competing firm is indirectly borne by all.

Many industries in England maintain associations for the spread of information. One such performs another service which is quite out of the ordinary and yet very valuable. A manufacturer estimates the number of rejections he expects to have of any part and orders raw material enough to cover them. He may estimate that rejections will amount to 25% but suppose that they actually only reach 15%. He may be left with 10,000 parts, say of a time fuse, over his requirements. He tells the secretary of his association who in turn notifies all members. In this way the excess parts are sold at actual cost. These associations also standardize cost systems and exchange ideas on reducing costs.

The Ministry of Munitions is of great value in stimulating this cooperation. They indicate best methods and throw open government arsenals so that these methods may be studied.

2. Unusual activities should be avoided as much as possible. If you are thinking of taking war orders, choose those products which most nearly resemble your peace-time output. If your peace-time product is automobiles, consider carefully before you enter into shell production. Automobiles may be, and probably are, needed by the government and it would be poor business and worse patriotism to try a new line under these conditions. The needs of an army are so varied that many factories can keep right along with the usual kind of product and still be performing a war-time service to the nation as a whole.

Many organizations can choose a product which, while not standard with them in peace-time, can nevertheless be made with the existing equipment and with a minimum of readjustment. All of these things help to put

a nation on a war footing quickly and with the minimum of economic waste. Incidentally, when this is done, the "patriotic profits" are more sure.

3. Proper preparations should be made before attempting war work. In my own case this consists in using great care in making tools, jigs and gages. We nave actually spent as much as 75% of the contract delivery time making these appliances before starting actual production of the war material. When we do start on the real work, however, the complete equipment we have to work with enables us to get greater accuracy and speed, so that the time is well spent. This preparation cuts down imperfect work and so conserves raw material.

In my own plant, where tools and gages are so important, we have practically put tool making on a straight manufacturing basis. Most tool making is highly specialized and the tool maker is a temperamental worker who is allowed to go about his work in his own way. I have found that standardized manufacturing methods can be applied here as elsewhere, resulting in increased efficiency and output.

4. Women must be trained, starting now, to take the place of the men in business. Ultimately there is apt to be a heavy drain on America's manhood and you should anticipate this as much as possible by starting early to train the women in their work. There are few places they cannot fill. At repetition work and tasks requiring deftness of touch they generally excel men. You doubtless know how they are doing men's work in England, in the shops, running street cars, buses, and motor trucks. However, they cannot step right into these unfamiliar jobs without training. Do not wait until your men are called and then have to put in unskilled women, when demands for production are heaviest. Start now. One

word more of advice—when a woman does a man's work, pay her what a man would get.

5. Train understudies, so that if your executives are called for war duties in the trenches or elsewhere, your organization will not be crippled. We have had dozens of our executives, from foremen up, called for work in arsenals or in other positions for which their training fitted them. Early in the war we were sometimes badly disorganized when this occurred. Now we have at least one understudy for each job, and I believe that the entire executive staff could be called without reducing our output 10%. This is a very valuable lesson, for in peace time it will do away with the condition of having a man on the staff who thinks, and rightly, "The firm can't do without me."

6. Frequent conferences have intensified value in war-time in developing best ways and in avoiding friction in the organization. In my concern I hold semiweekly conferences over which I preside. Production problems, in their larger aspects, are considered in these meetings; standard practice is worked out, and questions of policy and authority decided upon. In addition there are daily departmental conferences attended by production men, superintendents, foremen, inspectors, engineers and the like. These help mightily.

IT is on the continuance of our industries that the state itself depends. The state is always a pauper, without any actual reserve capital other than what is provided by acts of Parliament. It is absolutely essential to keep industries active, fully employed, and with ample capital at their disposal for the conduct of the business of the country.

SIR WILLIAM H. LEVER, BART.

CHAPTER XVIII

FOOD AND THE WAR WORKER

Edited by the Editorial Staff of SYSTEM, the Magazine of Business

Whether you are an employer or whether you work for another, you are interested in the sort of diet that helps to keep workers up to the mark of greatest effectiveness. In this chapter are presented some of the facts that the Health of Munition Workers Committee of the British Ministry of Munitions found out about the close relation of food to work—a subject all the more interesting while we are encountering both a food and labor shortage.

THE living body constantly is losing energy in the form of heat and mechanical work and this loss is made good principally by food. An examination, therefore, of the value and character of the food consumed by munition workers is desirable at this time.

The loss of energy due to the cooling of the surface of the body is greater than that due to mechanical work; the latter is variable and may be small. The amount of food taken should be regulated by the loss of energy it is required to replace and not by the demand of appetite. The amount of food required bears a closer relation to the extent of the surface of the body than to its weight, owing to the greater cooling surface, and tall, lean men, therefore, require more food than short, fat men of equal weight. Growing boys and girls require comparatively more food than adults because their bodies present a greater cooling surface compared with their weight and because they also must provide energy necessary for the proper amount of growth.

Hard labor in the open air calls for an increased food supply. Sedentary work in a heated and confined atmosphere reduces the output of energy and less food is required. A laborer may lose one-sixth or more of his total energy output as work, and the remainder as body heat. A sedentary worker may lose little energy as work, and almost all as body heat. As activity increases the loss of body heat, energy grows out of proportion to the actual energy expended as work.

A tired man benefits by a brief rest before a meal. Fatigue prevents the proper digestion of food, and one of the earliest symptoms of overwork is some form of digestive derangement. Nervous energy is required to control the work of the digestive organs, and nervous fatigue as well as physical fatigue is followed by digestive disturbances. Food should be taken regularly and not hurriedly, thus maintaining strength without overloading the digestion. It should not be taken between meals or at frequent intervals, because a good digestion depends upon a "good" appetite.

Protein, fat, and carbohydrates are the essentials necessary to replace energy expended and for the repair and growth of the body. Certain salts, and other substances of an unknown nature called vitamines, exist in minute quantities in fresh foods and are also necessary for the growth and health of the body, but these it is difficult to consider in a general dietary plan.

Protein is the chief solid constituent of lean meat. It is also present in milk, cheese, eggs, and to some extent in all vegetables. It is not only a source of energy but also a body builder and no dietary can be complete without it. Fat is chiefly derived from animals. Nuts are rich in fat but little is contained in vegetables. Carbohydrates are mainly derived from vegetables in the form of flour, potatoes, or sugar. Fat and carbohydrate can replace one another in a diet, but the body digests

and deals best with a certain proportion of each. Fat yields weight for weight more than twice as much energy as carbohydrate, and in cold climates and cold weather more fat is naturally eaten.

The energy value of a foodstuff can be determined by burning a weighed quantity of it in an apparatus called a calorimeter, and ascertaining how much heat it gives off. The large calorie, which is used as the unit of energy value, is the amount of heat required to raise 1 kilogram (1¾ pints) of water through 1 degree Centigrade (1.8 degrees Fahrenheit). Such a calculation shows that, when dried, foodstuffs contain the following energy value:

One gram of—

Protein .....contains 4.1 calories
Carbohydrate .....contains 4.1 calories
Fat .....contains 9.3 calories

A pound is equal to 453.6 grams and thus it is easy to find the number of calories in a pound of a given foodstuff. For example, suppose one pound of roast beef contained:

Protein 26.75%
Fat 12.90%

in this case there would be $(26.75 \times 4.1) + (12.90 \times 9.3) = 229$ calories per 100 grams. In the pound of meat there would, therefore, be $229 \times 4.536 = 1{,}040$ calories.

The energy expended in mechanical work can also be expressed in calories, for by experiment one calorie has been found to be equivalent to the energy expended in lifting 2.2046 pounds through 1,329.4 feet, which is about the energy expended by a man 154 pounds in weight in walking up a stairway 20 feet high. To perform this additional work in a day, such a man would therefore require one extra calorie in the energy value of his food. Even in walking on the level the body is

raised at each step and the calculation has been made that to walk 2.7 miles in an hour on a level road calls for the expenditure of 160 calories in a man weighing approximately 154 pounds.

Ordinarily only about 15% of energy expended is derived from protein, so investigation shows, and about 80% from fats and carbohydrates combined; that is normally protein supplies only one-fifth of the total energy expended.

Exhaustive investigations have shown that the energy required by a man engaged in fairly light munition work is about 3,500 calories of food as purchased. Where calculations are based on food eaten, the minimum diet in the plant lunch room or restaurant may be estimated to be about 3,000 calories when balanced among the three classes of foodstuffs in the following proportions of dried weights:

Protein	100 grams
Fat	100 grams
Carbohydrate	400 grams

This diet can be supplemented with fruit or other small addition according to individual taste, and the consumption of fresh fruit, such as apples, oranges, and bananas is highly recommended. The drinking of strong tea or coffee many times during the day is physiologically unsound, as is the consumption of candy between meals, especially by boys and girls.

Men engaged in hard physical work, especially in the open air, may consume as many as 4,500 calories with advantage. On the other hand the energy required from food by a man fully dressed, lying at complete rest at ordinary room temperature in a still atmosphere, is about 1,600 calories; while for a man engaged in a sedentary occupation as little as 2,200 calories is probably sufficient. An average adult woman worker re-

quires about three fourths as much food in caloric value as an average male worker.

In order to determine the kinds of dietaries provided for munition workers, specimen meals were obtained from a number of restaurants attached to munition works, and, to serve as a contrast, from other sources as well. The amount of protein, fat, and carbohydrate in each meal were estimated, the caloric value calculated, and the costs of the meals determined.

IS YOUR PLANT LUNCH ROOM'S RECORD AS GOOD AS THIS ONE?

From these investigations it was found that the average plant restaurant dinner is a good one, containing, as it should, an energy value of about 1,000 calories, well distributed among the amounts of protein, fat, and carbohydrate. Apart from caloric values, usually the meals were well cooked and of good materials. The cost compares favorably with cafe or outside restaurant charges and so the worker gains in pocket. It is important that the workshop be thoroughly ventilated at least once during a work shift and the custom of eating meals in the workshop should be discouraged. No matter where the meal is taken, it should not be in the place of work.

Many workers bring food from home to be consumed at the lunch hour, sometimes purchasing a dessert or a drink from a nearby restaurant or the plant lunch room. Generally it was found that about the right amount of energy-producing food was contained in these home-made meals, with the exception of the boy workers, who usually brought too hearty a meal.

Each of the three normal meals of the average working man should contain 1,000 calories as eaten, and of a working woman from 800 to 900 calories. Women, however, so investigation proved, were apt to eat meals

unsatisfactory in energy-producing units, and largely consisting of starches and sweets. Food which they brought from home was found to vary in nutritive value from 295 to 1,143 calories. The latter figure is more than sufficient but the first figure is not enough even though very liberal meals are taken at home, and even if hearty meals are taken at home the distribution of the day's eating is along wrong lines, for in a long day's work there should be a good meal in the longest break, if the efficiency of the worker is to be maintained for months and years. Experience also indicates that for a large class of workers home meals are hurried, and especially for woman too often consist of white bread and boiled tea. A worker starting the day with a bread and tea breakfast and walking or traveling for an hour or more to work, cannot long remain an efficient worker. Much lost time from illness arises from this cause.

* This same condition held true of meals taken by women outside of restaurants, the tendency being to indulge the appetite in sweets and delicacies rather than to eat food which would produce the required energy.

The erection of hotels required on account of the inadequacy of preexisting accommodations for housing the suddenly increased personnel of certain large munition factories, has afforded an opportunity of investigating the whole daily dietary of workers. The investigation was made at a well-managed hotel where each worker ate as much as he or she desired. In the dining room there are separate tables for men and women. By weighing the food supply to a definite number at given tables, and also the uneaten residue, the cost of

*In order to render assistance to caterers for munition workers, a series of small but adequate meals has been planned by British dieteticians. The dinners were selected from specimens analyzed in the laboratory and the other meals are computed from data obtained from well-managed factory lunch rooms. If you are interested just write to the Librarian of the A. W. Shaw Company, who will be glad to supply you with this data.

each ingredient being known, the management obtained the cost price of food per week and found it amounted in March, 1916, to $3.79 per man and $2.95 per woman. This gives the consumption for a woman of .8 that for a man, a ratio in agreement with that stated previously.

The amounts of protein, fat, and carbohydrate present in the food consumed, were estimated in two ways: (a) The management weighed the amount of each type of food served throughout the day to six men and six women, and deducted the amounts unconsumed. The amounts of protein, fat, and carbohydrate present were determined at the laboratory from known data; (b) The hotel was visited personally and the amounts of all the most important constituents of the menu actually eaten by a large number of persons were weighed. The average daily ration consumed per person was calculated from these data and then samples of the foodstuffs were analyzed as above.

The caloric values obtained by these two analyses, 3,847 in one plant eating house and 3,913 in another, should satisfy the requirements of factory workers unless very heavy work is being done, and should, perhaps, be reduced somewhat if facilities for getting extra food are afforded to those who desire more. Excess food either passes into useless adipose tissue (fat) or is imperfectly utilized, thus impairing the digestion and efficiency.

THE war requires that production of raw materials must be maintained. Not only is there necessary great wisdom on the part of the government, but also patience and patriotism on the part of those who control the vital industries.

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CHAPTER XIX

WOMEN AND WAR WORK

Collated by the Editorial Staff of SYSTEM, the Magazine of Business

No one can know exactly what conditions this war may lead to. It may be that every able-bodied American will be called to the front to face the forces of the nation described as "both the most powerful and most cruel that ever existed." To a great extent this condition already prevails in Great Britain and the gaps in the ranks of the male workers have been largely filled by women, especially in munition plants. And in this country it is already officially estimated that 1,000,000 women may go into munition factories.

THE extensive utilization of women as industrial workers under war-time conditions has been investigated thoroughly by the Health of Munition Workers Committee of the British Ministry of Munitions and its findings and recommendations should interest American business men. They are digested in this chapter from the official memorandum issued by the committee.

The employment of women in munition manufacturing presents many interesting features. Probably the most striking is the general response to the country's call for help. Numbered among the munition workers are former dressmakers, laundry workers, textile workers, domestic servants, clerks, shop girls, students, and in fact women and girls of every social grade. They have pressed and are pressing into industry with a spirit of patriotic service which is finely maintained.

Consideration of the industrial employment of women, apart from the question of wages, falls naturally into

five subdivisions: (a) The period of employment including night work, length of hours, overtime, and the like; (b) rest pauses and provision of meals; (c) sanitary conditions of the plant; (d) physical condition of workers; (e) management and supervision. These questions bear directly on the interests of the women themselves, and the output of which they are capable.

The imperative necessity of war has revived the night employment of women in factories after almost a century of disuse. Great Britain, Austria, Belgium, France, Germany, Italy, Portugal, Switzerland, and Spain in 1906 agreed on the prohibition of industrial night work of women at the International Conference held at Berne. This action was based on reports which showed that it caused deterioration in health, disturbed home life, and diminished the value of work done. In a working-class home, so investigation showed, it was difficult to obtain rest in the daytime because quiet could not be easily obtained; the mother of a family could not sleep while the claims of children and home were pressing upon her; younger unmarried women were tempted to take the daylight hours for amusement or shopping; and sleep was often interrupted in order that the noon meal might be shared by all.

Evidence is highly conflicting as to the merits of continuous night work as against those of a weekly, biweekly, or monthly change of shift. Some employers state it is better to allow women to remain on night shift continuously for some months, their experience being that the difficulty of sleeping by day and digesting food at night is largely overcome by practice. Others claim that women who are engaged for night work only, are liable to remain but a month or two, and that those who offer themselves for permanent night work are less effective than those who prefer the day shift.

Many managers and foremen declare that the last few hours of a 12-hour night shift yield little output. This greater influence of fatigue at night is partly due to the fact that the hours between 3 a. m. and 6 a. m., and 4 a. m. and 7 a. m. coincide with the period when, apart from industrial fatigue, vitality is low, and partly because the worker lacks the stimulus of a satisfactory meal. There seems to be little appetite for a meal between 1 a. m. and 3 a. m. and at one factory the manager declared that fatigue prevented many of the women from even making the effort to go to the dining room. In another factory, visited during the early morning meal time, several women were asleep on piles of heaped-up work beside the machines. These facts bear additional witness to the relative failure of these hours. Women of extremely robust physique sometimes maintain a reasonable production, but the flagging effort of the majority is not only unproductive at the moment, but has its influence upon subsequent output, which suffers as in a vicious circle.

THE DISTANCE WOMEN LIVE FROM WORK OFTEN AFFECTS OUTPUT

The home life of women workers is frequently altered almost beyond recognition by night work, particularly where housing accommodations are inadequate and where a long working shift is aggravated by long hours of traveling. The effort consumed in getting to and from work must be considered by the employer. The superintendent of a factory situated in a congested district says the women often arrive with their clothes torn in the struggle to get on board an already overcrowded street car. Sometimes their lunch baskets are torn away in the crush. Such experiences have a wearing effect on nerves and body and therefore on output. In badly overcrowded districts "going home" merely means going

to a place where beds are never empty and rooms are never aired, for they, like their occupants, are organized in day and night shifts. Such a condition, of course, has a direct bearing on production, and many an employer has realized what might almost be termed a direct profit, by improving his employees' housing conditions to a great extent.

Long working hours, particularly at night, are perhaps the chief factors in fatigue. In the interests of both health and output they should be held in proper limits. There should be suitable pauses for rest during the working period, and adequate week-end rests in addition to periodic holidays. It may be stated broadly that working conditions which try the average man, try with greater severity the average woman, because of her different constitutional development. It is likewise apparent that though conditions of mental fatigue are probably equally injurious to boys and girls, muscular strain which would be borne by a boy without injury might be highly detrimental to a girl of equal vigor and physique. The importance of a wise limitation of women's hours of work and provision of adequate pauses for rest, can hardly be overstated. The weight of scientific evidence is behind such limitation, and without it health and effectiveness cannot long be maintained. Happily there should be little conflict between the interests of home and those of munitions in the question of hours of labor, for the hours which tend most to a satisfactory home life and health also contribute most to industrial output.

The three systems of employment most commonly adopted for women in munition works are: (a) One shift of 13 to 14 hours (the overtime system); (b) Two shifts of 12 hours; (c) Three shifts of 8 hours. In the long run the 8-hour shifts appear to yield the best results because strain generally is diminished, better

work results are maintained throughout the shift, there is less time lost from unpunctuality and illness, and there is less liability to accident.

The flagging output which characterizes the last hours of a 12-hour night shift, also seems characteristic of the last hours of overtime during the day. One large munition firm secured such bad results from the overtime system that it changed to a system of 12-hour shifts. If sufficient workers can be found 8-hour shifts will be introduced into this plant, as the 12-hour shift has also been found to be too long. Another munition firm employed some women 11¾ hours and some 8 hours. It found the longer hours exhausted the women without any corresponding value in production and this, with but few exceptions, is the usual experience of employers.

RECESSES OR PAUSES IN THE WORK HAVE HELPED TO INCREASE WOMEN'S OUTPUT

Pauses, well distributed and adapted in length to the needs of women workers, are of the greatest value in averting physical collapse and in spurring production. Many superintendents believe four hours is the longest continuous period a woman can maintain work at full vigor. A pause of 10 minutes within this period has been found to give excellent results. Where work is continued for a longer period a pause for some light refreshment is essential. It is particularly valuable in the morning spell in those numerous cases where breakfast has been hurried or omitted altogether, and in shell-filling factories where some of the high explosives seem to create a special feeling of hunger. Here there is the added reason that a well-fed worker is better able to resist the influence of poisonous materials.

Facilities should be provided at all times for rest in case of fainting or other temporary illness. These may well consist of a few comfortable seats and a camp bed

We all understand the necessity for conservation during the war. Here is an example of what England is doing. These women are learning to be their own tinkers.

This illustration serves to demonstrate that the war has given women a chance to serve in almost every line of business, for you see women doing work in a composing room.

Here's war-time vocational education for women with a vengeance. This is a class of English housewives learning how best to repair Venetian blinds.

There are mighty few lines of work in Great Britain now in which women don't lend a hand. Here are two "garage mechanics" starting out to repair a broken-down motor car.

for the more serious cases, in the "first aid" room now provided at many plants. Suitable seats of the "deck chair" type can be provided economically as regards both cost and space. Fix two strong rails horizontally, one 12 inches from the ground and 30 inches in front of the second, which should be 36 inches from the ground. Between the rails fasten a series of strips of strong material like canvas, cord, or wire netting, 54 inches long and 18 inches wide.

The week-end rest has been found to be a factor of such importance in maintaining women's health and vigor that it has been reinstated by employers who had utilized it for work at the beginning of the war. Unless under extraordinary stress it should always be allowed.

When women are employed on 8-hour shifts a half hour meal interval is normally sufficient, but if longer hours are worked an hour should be allowed for the noon dinner, and an hour for the night meal. Indigestion usually eventually ensues if substantial meals are immediately followed by work without an intervening rest. Half an hour, especially in large plants and in shell-filling factories where the actual consumption of food in the danger area is prohibited, gives but scant time even for eating. Ten minutes are easily spent in reaching the dining room and returning to work; another five are occupied in washing up and the service of the meal. This leaves but 15 minutes for eating the meal and where workers are required to "clock in" and "clock out" the available time is still further diminished. In connection with meals at the factory the importance of a well-managed plant lunch room for women and girls is urged. These should be located near the work rooms and kept open at suitable hours both day and night. In many cases, however, investigation developed that plant lunch rooms or dining rooms were in themselves only fresh occasion for fatigue as, for

instance, when they were dark, ill-ventilated, or had small, narrow benches only. These conditions should be avoided and the extra expenditure needed to make the lunch room really comfortable helps increase output.

The good effect of clean, bright, and airy work rooms, well heated, upon the health and energy of women and girls can hardly be exaggerated. Cleanliness and good order contribute to increased output as well as to discipline and morale, and provision of suitable washing accommodations is important. The requirements as far as structural points are concerned are that there shall be either (a) a trough with a smooth impervious surface, fitted with a waste pipe without plug, and of such length as to allow at least 2 feet for every 5 workers employed, and having a constant supply of warm water from taps or jets above the trough at intervals of not more than 2 feet; or (b) at least one lavatory basin for every 5 workers fitted with a waste pipe and plug or placed in a trough having a waste pipe, and having either a constant supply of hot and cold or warm water, or (if a constant supply of heated water be not reasonably practicable) a constant supply of cold water and a supply of hot water always at hand.

Cloak rooms should also be provided and, if possible, placed near the lunch rooms and lavatories. They should be roomy enough to enable workers to change clothing and should have drying facilities for wet clothing. Individual lockers, of course, are to be preferred. Cloak rooms should always be kept scrupulously clean.

Adequate and suitable sanitary accommodation is specially important. These conveniences for women should be situated so as to be always readily accessible, and with due regard to privacy. They should be sufficient in number, well planned, and of sound sanitary construction. A high standard of cleanliness must be

maintained and, if possible, an attendant should be in charge of toilet rooms during working hours.

It must be borne in mind that many women now employed in factories come from spheres of life which have hitherto not involved them in the strain and stress of industrial work. In considering the woman worker's physical capacity for industrial work it should, therefore, be always remembered that her body is physiologically different from, and usually much less strongly built than that of a man; that her muscular system is less developed; and that she may have lived a sedentary life and is not in the habit of taking active and regular exercise. The nature of her work should therefore be determined with due regard to its effect on her immediate and future health. Certain ailments and forms of physical disability to which women are liable are readily caused, or at least accentuated, by inattention to these matters. Among such conditions are: (a) disturbances of digestion, due to unsuitable food, irregular and hurried meals or fatigue; (b) anaemia, with possibly associated disease of the heart and circulatory system; (c) headache; (d) nervous exhaustion; (e) muscular pain and weakness, flatfoot and the like; (f) derangement of special physiological functions.

Though these conditions may not be immediately incapacitating, they have a tendency to become chronic in nature and far-reaching in effect; they lead directly to malnutrition and a reduction of body energy; if allowed to persist they inevitably lay the foundations of ill health and disease in later years; and in some cases they may exert an injurious effect on maternal functions. With a view to detecting minor ailments and incipient or actual disease such as tuberculosis or organic heart disease, it is desirable to provide for the medical examination of all applicants for employment. It would also be advantageous to arrange for girls who